MISSOURI BOTANICAL GARDEN

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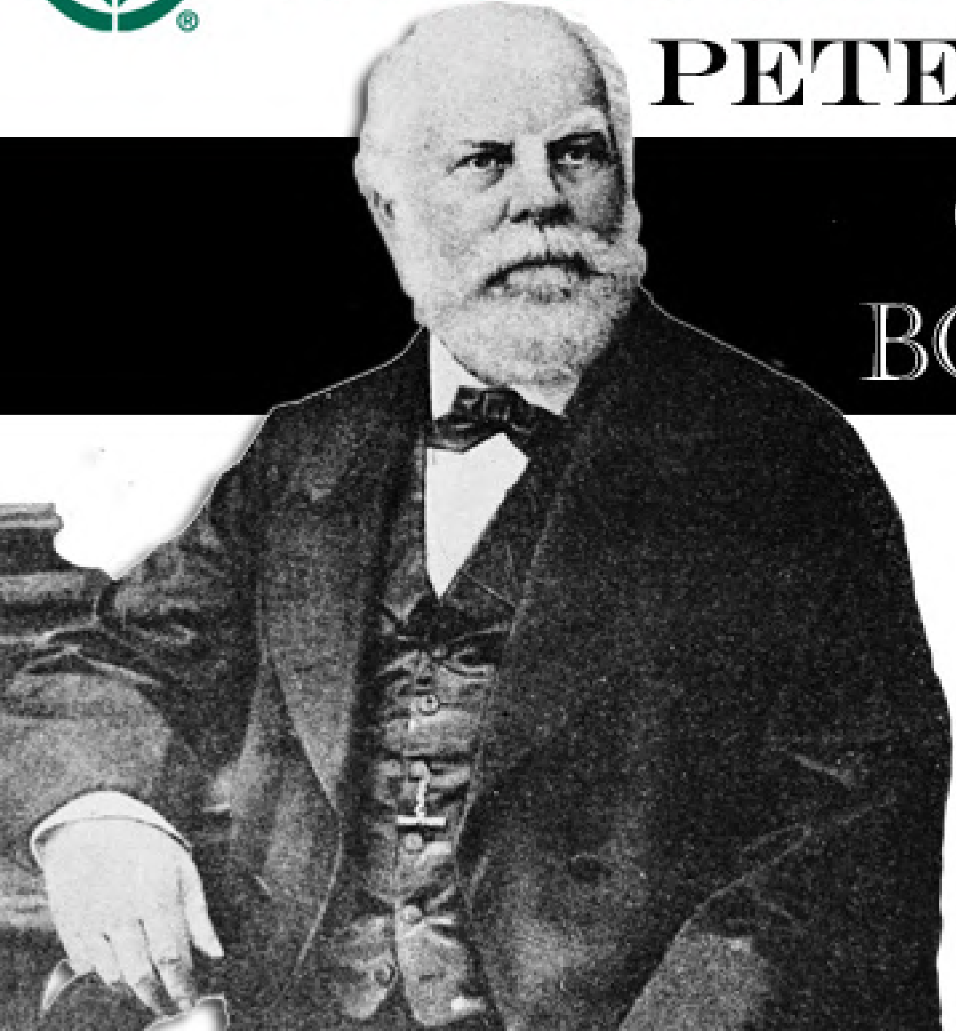
GEORGE ENGELMANN BOTANICAL NOTEBOOKS



Pagination Note:
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Cact. 39. |

July 1853 153

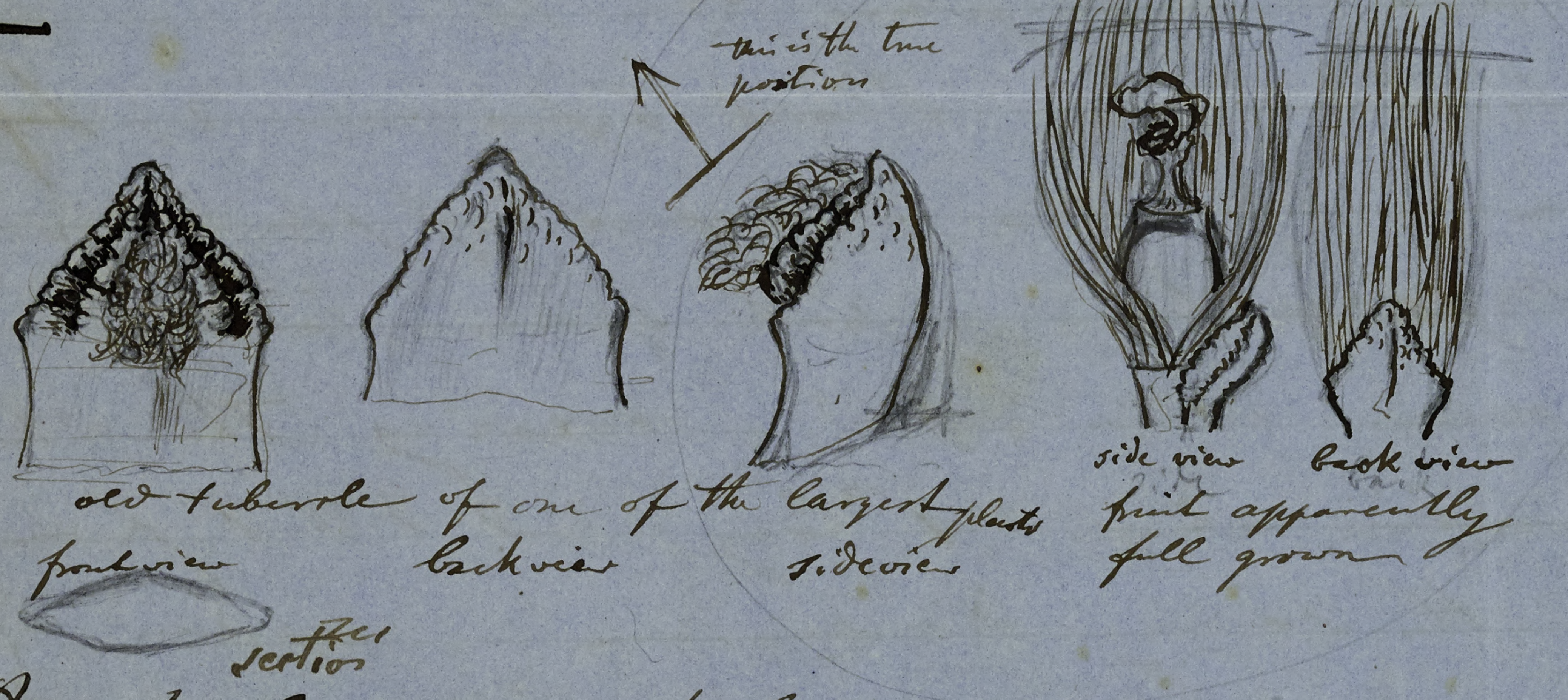
Echinocactus albispinus vide pag 100 & 196. Dr Parry observed it in January 1852 in going to the Gila from El Paso.

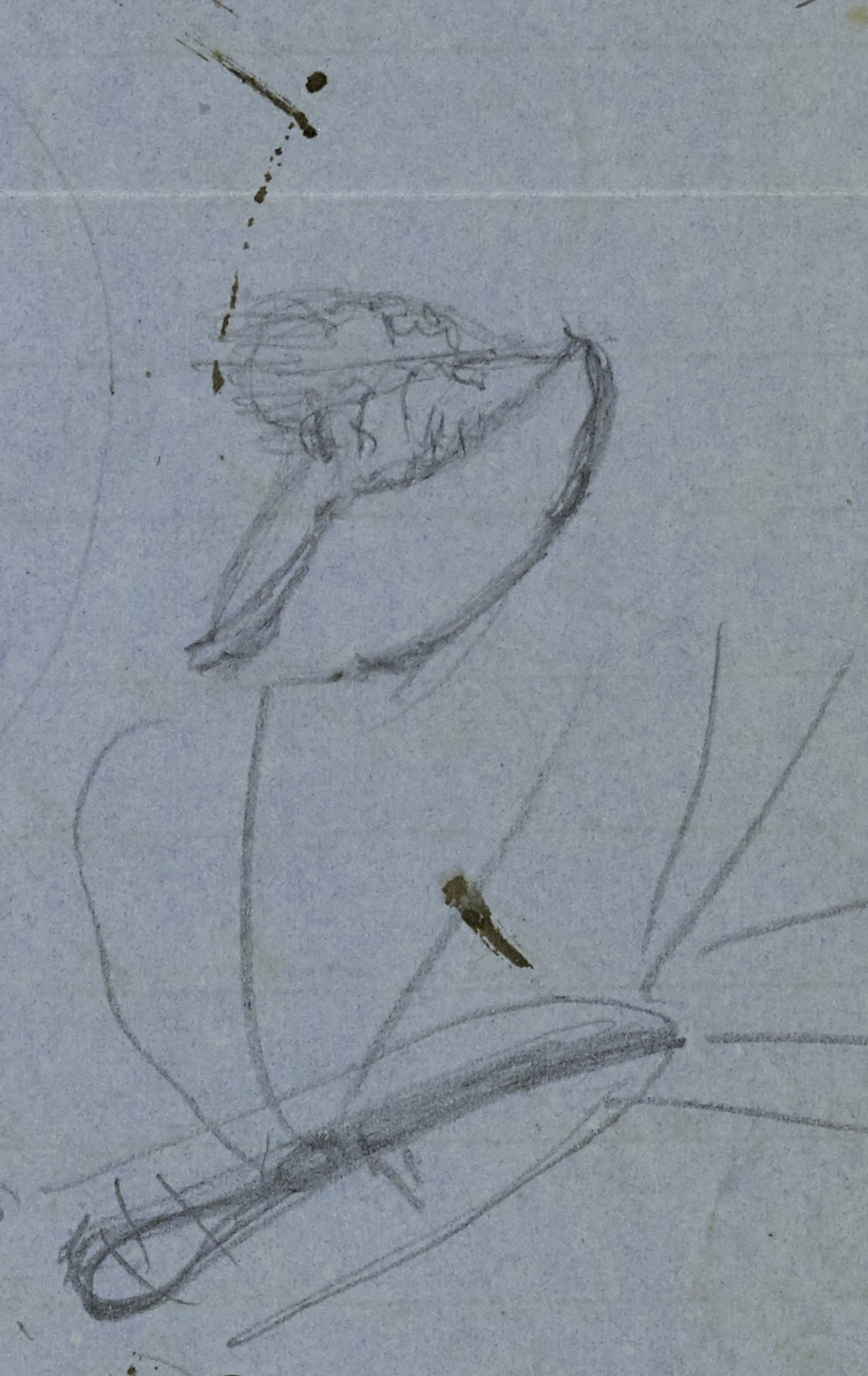
Plant 9" high, diameter 10" with the spines; ribs 13. obliquely acute, depressed between the areolae, almost tuberculated, lower part of the ribs especially ~~distinctly~~ divided ~~by~~ transverse grooves into distinct tubercles; 11 outer spines 12–15 l. long 4 central spines 1½ – 2 inches; the 3 lower ones recurved or twisted. —

Fruit oblong densely woolly, ~~with~~ setiform mucronate scales remains of flower persisting; 2 inches long: mucronate scales projecting above the fruit.—

On the upper or younger part the tubercles are compressed laterally, on the lower part rather from above or transversely.

Intervals one inch deep (grooves between the ribs ~~or between the tubercles of the same rib?~~)


this is the true position
old tubercle of one of the largest plants
front view
back view
side view
side view
back view
fruit apparently full grown
section



Anhalonium tuberculatum

ctenoides pag 401

Cereus flaviflorus from Santa Rosa

(hitherto taken for Cereus pectinatus) subsimplex ovatus, ~~15–16 costatus~~ costis 15–16 obliquis subinterruptis; areolis lanceolatis approximatis; aculeis ~~radialibus 15–21~~ ~~albidis~~ rigidis basi lateraliter ~~compressis~~ ~~5–6 terminalibus~~ ~~exterioribus a~~ 14–22 radialibus arcte adpressis, subrecurvis (½–1‴ long) ~~saepius additis~~ albidis ~~14–16–22~~ summis & brevioribus, infimis longioribus ~~[illegible]~~ (1–2‴) lateralibus longissimis (3–4‴) centralibus 2–3 (rarius 4) uniseriatis robustis basi bulbosis, brevissimis (½″)

Floribus ex axillis anni prioris versus apicem

plantae ortis; campanulatis (diurnis) flavis; ovario ovato pulvillis 44 ~~stipato~~) ~~plus quam~~ sub 40 lana brevi albida setisque sub 15 brevibus rigidis ~~stip~~ albidis apice fuscatis stipato; tubo campanulato ~~pulvillis sepaloideis~~ sepalis squamiformibus in axillis (cum setis 3–10) pulvilligeris sub 30 instructo, sepalis interioribus 15 petaloideis (15 ~~exterioribus~~ inferioribus) ~~lanceolatis~~ acutis, acuminatis, intimis ~~oblatis~~ oblongis obtusis, omnibus ~~aristatis~~ fusco-mucronatis; petalis 25– ~~xix~~ 30 ~~oblongis~~ ~~obovatis~~ ~~lanceolatis~~ spathulatis eff, ~~flavis~~ obtusis emarginatis vel obcordatis erosa-denticulatis (saepe mucronulatis ~~aristatis~~) flavis ~~medio~~ basi ~~ungue~~ virescentibus; filamentis numerosissimis virescentibus brevibus, stylo ~~flavescente~~ albido longiore, stigmatibus 10 12 ~~viii~~ teretibus, obtusis erecto patulis, viridibus, —

Eagle pass Santa Rosa, Dr Bigelow Jan 1853 — in flower June & July (2d 1853) St. Louis — Plants before me 2–~~3½~~" high 1½–2½ inches in diameter; aspect of plant very much like E. ~~pal~~caespitosus, but spines stouter, and at the apex more interlocked, covering the whole surface of the plant. — Areolae about 1'' long and distant from one another about the same dimension; spines whitish or ashy, and in some specimens with light brown tips; — Some specimens have only 14–16 spines one upper, one lower, and 6–7 lateral ones on each side; in older and larger ones have 7–9 lateral ~~small~~ ones, and often several small bristly ~~5–6 spines~~ adventitious spines ~~[illegible]~~ at the upper ~~edge~~ of the areola; upper spine ½–1 lower ~~one~~ 1–2 l., lateral ones 3–4 l. long, interior sp. 1–3, rarely 4 l. long —

~~Flowers~~ beautifully bright yellow; open from 8 till 1 o'clock, — ~~at once characterized marked by the obtuse petals~~. (One flower only seen) length 2½–2¾" (including the ovary 9–10''' ~~⅓~~ ~~¼~~ long) 2½–3 inches wide ~~Open about the same diameter, cupshaped~~, the broad and obtuse petals forming an even margin all round. Ovary with 38–44 pulvilli, scale obsolete, wool short, & bristles about 15 in each bunch 2 ~~2½~~ ~~3~~''' long; pulvilli of tube ~~in~~ the axills of green fleshy sepals ~~about~~ 25–32, the lower ones with

‡ lower part of tube narrow ~~naked~~ for about 1½ lines, then filiform 155
covered with greenish very numerous and very delicate filaments;
anthers small, pale yellow;

8-10 shorter (about 3''' long) and the upper ones with 3-4
longer (5-6''' long) bristles; 13-15 interior sepals all tipped
with a brownish bristle; 25-28 petals; Petals yellow
with green very distinct narrow claws, deep yellow in the middle and paler
on the margins; 1½-1¾'' long, ½'' wide ‡ - stigma green cupshaped, divided into
10-12 terete obtuse stigmata 3 lines long - The green deep stigmata in
the ~~yellow~~ yellow flower with a pale green
base ~~for~~ give it altogether a remarkable appearance.

The plants from ~~the Limpio &~~ Pecos coll.
by Wright probably belongs here; it is somewhat
branched, the branches subglobose; 16-19 rows of
tubercles; radial spines 14-15, centr. 2-4 very
short.

From Eaglepass Dr Bigelow has sent a few
plants which are evidently the same species
they ~~are~~ simple however more cylindric, with 15 straight
ribs, and regularly 14 rad. spines ~~one~~ one upper, one lower
and 6 on each side. 2-3 interior spines ½-1½
l ~~long~~. - Areolae when young woolly, appearing oval
or orbicular, but the old ones when destitute of wool
are almost linear. - Young spines rosecolored at tip #

C. adustus has oval, much shorter areolae, n. 401
and weaker spines

A Cereus has been sent by Wright (from the
Pecos ?) which closely resembles our plant
but it is destitute of central spines entirely!
Plant oval, 3'' high 1½ in diameter, with 17
straight ribs, approximately linear areolae
and 18-22 radial but ~~no~~ central spines
spines stout, young ones rosecolored above the middle
Before having seen the flower, nothing can
be said about this form; so far however
I must refer it to our species.

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Cereus dasyacanthus resembles ours very much in the flower, though the spines appear to differ sufficiently — they are all straight, not strictly radiating and the central ones are numerous and longer. — The flower of Cer. das. is somewhat larger, externally reddish, petals mostly acute, often abruptly acuminate, aristate, but in some specimens also obtuse (I have seen the same difference in the flower of C. caespitosus, where some have obuse, retuse petals, while the majority have acute or acuminate petals)

C. pectinatus from Chihuahua (Wislizenus) resembles our plant very closely, but has red flowers! —

The number of ribs in the only specimen seen by me was greater (23); one upper one lower and 7 or 8 lateral spines on each side just ~~about~~ as in our species — 2–5 central spines regularly superimposed, very short — more regular than in our species. — The spines of C. pect. are more slender all the lower ones rose colored with dark tips — but no essential difference I can not discover

Could it be the same plant with yellow and with purple flowers?

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Cact. 40 /

vide pag 111

Aug. 1853

Echinocactus brevihamatus Eaglepass, Dr Bigelow

These specimens as well as one sent by Wright and described page 111 grew beautifully and assumed a very dark green colour; though they were treated in the same manner as all the other Cacti. Suddenly two of them showed signs of decay and on examination proved to be entirely rotten within, though healthy and hearty outside. They could not be saved.

The finest specimen from Eaglepass is almost 4 inches high and has 3 in diameter. 13 somewhat spiral rows; grooves very acute; ribs compressed but obtuse, interrupted, or tuberculated; tubercles resembling those ~~of a~~ Mammillaria, grooved on their upper side down to their base, where there appears an areola (floriferous) groove ~~and~~ areola woolly. Areolae of spines 7 or 8 lines distant from one another; orbicular with short white wool. Radial Spines light yellowish brown finely ashcoloured or whitish, upper ones lighter, lower ones darker coloured, all with dark tips, 12 in number, 5-10 l. long, lower ones shorter upper ones longer. Central Spines 4; three upper ones √ directed upwards? straight √ or with a slight curvature upwards and backwards √, compressed or slightly angular, whitish with dark tips mostly the two lateral ones longer than the middle one, 16-22 l. long, middle one mostly 8-10 l. long; equal to the upper radial spines, but stouter; sometimes the 2 lateral spines are unequal, and one not longer than the middle one. ~~These~~ 3 upper central spines are directed upwards, and towards the apex of the plant form a dense mass, within which the flowers are enclosed. —

The lower central spine is stout, compressed, with a short and acute, dark brown or black hook (directed outward) 10-14 l. long, yellowish brown, often lighter on the lower and darker on the upper surface young Areolae orbicular, 2 l. in diameter; Groove on tubercle about 4 lines or 4-5 l. long.

The flowers of this plant I observed in a specimen sent by Dr Bigelow; it was in flower when I opened the box, in April and continued to flower for several weeks.

In a specimen sent by Wright, it was evident that the 3 upper radial spines are lighter, the 6 lateral ones darker coloured &c — There are some variations; in some instances several additional spines; sometimes 2 additional central spines and one or two radial ones;

Flower: 12-16 lines long, only 9-10 lines wide when fully open ~~at the noon~~. Lower sepals (on ovary) 5-7, reniform with scarious somewhat fimbriate margins; sepals of the tube about 8, lower ones short ovate mucronate, with entire scarious margins, upper ones oblong linear obtuse; petals 13-14 linear-lanceolate acute, mucronate, entire, 7-8''' long 2''' wide, pale rose or flesh colour with deeper coloured midrib; Stamina numerous, with red filaments; stigmas 10-11 radiating, obtuse yellowish, slightly exceeding the stamina.

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Mamillaria calcarata from the Nueces see pag 149 In flower August 10th, does not differ at all from the flowers of the Texas plant. Stigmata 7 spreading — flowers same large size, yellow, somewhat lurid, with red (miniate) base inside.

Mam. vivipara Nutt.? Common around Fort Pierre. Received in July 1853. — Allmost all the specimens ~~have~~ are single, globose, about 2 inches in diameter 1½ inch high from the ~~top~~ of the root, half of the body however buried, only about 1 inch high above the surface. — Tubercles cylindric 5–6''' long 1½–2''' in diameter, slightly grooved to the lower third (not to the axill) groove tomentose when young, lowest part (a sort of areola) more so. Radial spines 14–19. white, the upper ones sometimes with yellow tips; 2½–3½''' long; central spines mostly 4; sometimes 3; 2 or 3 directed upward, 1 downward. all stouter, yellowish below, dark purple brown or light brown above. — lower one shorter upper ones a little longer than the radial spines. In some specimens there are 3–5 upper central spines. —

Most specimens simple — appearing hemispherical & depressed — in few only some of the outer withered tubercles produce some branches; — proliferous they can not be called! —

Jul. Froebel says he has seen this ~~form~~ from the Arkansas to the Cimarron and to Sta Fe on his way to Santa Fe; — ~~and~~ Could this be the M. radiosa borealis? — and are two species on the Missouri? — I expect the apiculate stigmata in the flowers will decide.

Since writing the above I have received (Aug. 1853) from Mr Hayden specimens from the same region between Fort Pierre and the Mauvaises Terres

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which are much more vigorous; Plants simple or mostly cespitose, branching from the lowest, oldest tubercles. Larger stems 2-2½ inches high, 1½-2 inches above ground 2 inches in diameter; tubercles lax, in 8 rows, 5-7''' long, grooved to the middle or to the base, axills naked, proliferous at the ~~lower~~ end of the groove; yg areolae with considerable white tomentum; 14-16 rad. spines, white spreading 3-5 l. long; Central spines usually 4; 3 upwards and 1 of the same length but usually stouter downwards, 5-6''' l. red at base dark brown or black upwards. But often the number of upper ~~radial~~ central spines increases to 4, ~~5~~ and 5; rarely there are two lower stouter central spines.

See p 57

Mr Hayden also brought a few specimens of M. Nuttallii much stouter and finer than I had seen the plant before. It is always simple as he informs me. The largest specimen 2¼ inch above ground and of the same diameter. Tubercles closer than in the former, in 13 rows, cylindric, upwards rather ovate, grooved on the upper surface down to the base, groove above slightly, towards the base densely woolly, but axill properly speaking naked; areolae, even younger ones sparingly tomentose. Spines grayish, or yellowish not white properly speaking, even when quite young, mostly yellowish brown at tip, soft, ~~weak~~ flexible, ~~hardly~~ not stiff enough to hurt ~~me~~ like bristles; pubescent, even the older ones 16-18 4-6''' long; rarely a little stronger central spine, of the same length.

~~4~~ 5''' in one, 6-8''' in the other specimen long 2½-3''' in diam.

Fruit at present (August) exsert green globose lateral, yet crowned with the withered flower, which soon afterwards fell off

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Cact. 41 | Sept 1853

Opuntia cult. in open soil in Riehls garden Sept 9th 1853 (day of Riehl's death) from seeds sent by Lindheimer 1848 – in full bloom and with fruit. – It appears to be ~~one~~ of the hybrid forms of O. Lindheimeri ~~ana~~ & O. vulgaris? Seeds no doubt of O. Lindheimeri. –

Erecto patula, articulis obovatis, magnis (6 inches) ~~subspinosis~~ aculeatis; areolis fusco-setosis, aculeis subteretibus, ~~variis~~ s. paulo compressis singulis s. binis, variegatis (albidis, flavidis saepe fusco-maculatis) Ovario elongato (2¼" long 6-7''' diam) ~~saepius sterili~~ ~~sepalis~~ ~~ovatis~~ teretibus 13 obsito sepalis 8-9 teretibus coronato; sepalis interioribus 8-9 ~~ovato~~ acuminatis, ~~viridibus~~ minoribus viridibus, margine petaloideis; petalis 8-9 lateobovatis s. subrotundis, obtusis, s. retusis, s. cuspidatis, sulphureis, basi miniatis; filamentis miniatis; stylo miniato vix stamina superante stigmatibus 6-7 obtusis, sulphureis erectis s. subpatulis; corolla aperta 3½" lata

The plant showed a monstrous flower, figured here; the ovary changed into a complete joint (stem) with the cavity and ovules almost obliterated; – 4" long 2¼ wide, flattened, flower otherwise regular

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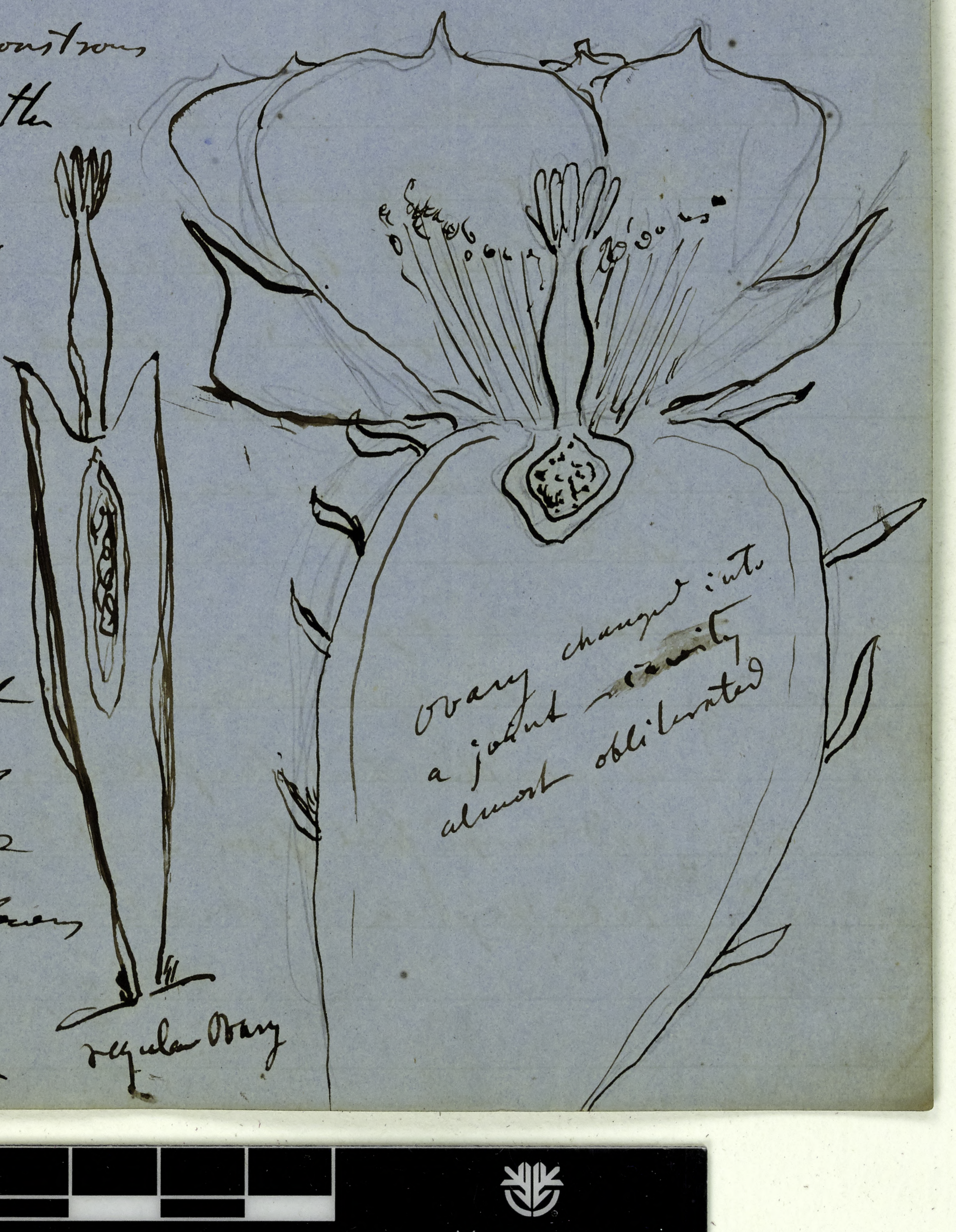
This plant is not as erect as O. Lindh. but has the same large seeds and elongated ovary; it flowers later than O. vulgaris and is distinguished from


regular Ovary
Ovary changed into a joint ~~cavity~~ almost obliterated

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O. vulgaris? by the elongated ovary which only in its upper half bears the ovula; the lower half is solid. In O. vulgaris only a small part at the lowest end is solid. —

Among Dr Greggs Cacti from the country between the City of Mexico and Mazatlan, coll. 1849 in May or June is what I take to be a fruit. In its present dry state it represents only an agglomeration of more than 200 areolae or pulvilli; ~~each subtended~~ by a mass of them subtended by a black scale 4-6 l long the inside is entirely gone; it is hollow and contains numerous loose seeds, not ripe but the testa apparently fully developed. — On top of the ball (or fruit) is the remains of a flower about 1 inch long, with numerous apparently lanceolate-linear (black & shrivelled) sepals —

The pulvilli are 6 l. in diameter, semiglobose covered with a soft dense fulvous wool (1½-2 l. long); and beset with 50 or 60 spiny bristles, of bright rusty colour, 6-12 l. long, straight or somewhat curved.

Seeds 1,8 l. long, 1.2 in the largest diameter, strongly compressed, black shining, smooth, strongly carinate on the back and slightly grooved scrobiculate toward the carina; hilum oblong linear white — Unfortunately all the seeds contain no embryo.

There was no label to the specimen, but it is possible that the following belongs to it, "1233. Dry flower and unripe fruit from 3 sided stem Cactus; fl. whitish. Hills near Mazatlan. June 22d. 10-15 feet high".

Octob 1853

The specimen with the same label is:

Cereus caule erecto elato alato-triangulari, costis alato-compressis areolis distantibus, immersis, hemisphaericis albido tomentosis; – aculeis rectis robustis valde inaequalibus, 2–3 longioribus (uncialibus & ultra) plerumque sursum rectis patulis, minoribus 6–12 plus minus deflexis

The young branches before me are about a foot long and 2 inches in diameter, ribs (dry) winglike compressed, ligneous centre forming a hollow tube; the ribs are as it were crenate, and in the indentures the areolae are situated; areolae 2½–4 lines in diameter, hemispherical, and with the spines coming off together; stouter spines 12–20 l. long, mostly directed upward, outward, & rarely some downward, the other spines, from 2 or 3 lines to 1 inch long are directed mostly downward, but also vertical and lateral, – always below the larger ones. The lower areolae of a branch mostly bear smaller spines than the upper ones, Opuntia like! –

The fruit described above appears to belong to this species

Plant very similar to C. variabilis but that fruit appears widely different.

Dr Gregg sends seeds of another „Organo, with edible fruit," resembling in appearance the foregoing plant very much.

The seed is black, tuberculated, opaque, 1.1 to 1.2 l. long, and 0.7 l. in diameter, compressed but back rounded not in the least ~~tub~~ carinate, very oblique; hilum oblong; no albumen; embryo hooked, or curved,

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Nov. 1853

cotyledons ~~dis~~incumbent or sometimes
oblique — foliaceous — see figure

see pag. 56. 57. 100. 168.

Examination of flower of Cereus giganteus
collected by Mr Geo Thurber beginning of July 1851 on the
Gila: Mr Thurber says, that they were the last flowers
of the season; and ~~ripe~~ fruit was ripening ~~seen~~ at the same
time on the plants; proper flowering period: May & June
fruit ripe July & August The specimen before me is half a flower (no
style), much shrivelled up and no doubt smaller
than the fresh flower in every dimension.

—

Floribus versus apicem caulis ramorumque ~~sparsis~~
aggregatis tubo amplo breviusculo petalisque
patulis ~~campanulatis~~; ovario ovato
30-40 ~~sepalis~~ squamiformibus, triangulatis
acutis ad axillam albido s. fulvo-villosam × stipato;
× subinde areolam ~~unam~~ alternamve nigricantem gerentibus
sepalis tubi ~~40~~ 30-40 orbiculato-subtriangulatis
mucronatis (20 inferioribus 20 in axilla lanigeris
superioribus nudis); sepalis intimis
(summis) 10-15 spathulatis obtusis, carnosis (pallide viridibus, albescentibus);
petalis sub 25 obovato spathulatis obtusis
integris crispatis, coriaceis ~~carnosis~~ crassis (~~[illegible]~~ albidis
seu ochroleucis) Staminibus numerosissimis filamentis ~~supra~~
~~superiore tubi~~ parte adnatis (inferiore
nudo); stylo stamina paulo superante,
stigmate multifido

MISSOURI BOTANICAL GARDEN
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Bacca obovata s. saepe pyriformi squamis sepaloidis
triangularibus carnosis minutis stipata, ad axillam fulvo
lanatis; ~~Pericarpio~~ duriusculo, carnoso ~~[illegible]~~
valvis 3-4 irregulariter demum recurvatis
~~3-4 valvatim~~ dehiscente (~~aperiente~~); seminibus
numerosissimis in pulpa sacharina nidulantibus
oblique obovatis, laevibus lucidis, exalbuminosis, hilo (obverso laterali)
embryone cotyledonibus foliaceis
incumbentibus curvatis hamato

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Cact. 42 /

Nov. 1853

The dry flower is 3 inches long, but in the drawing it is represented as being 4 to 4 1/2" long and of the same expansion. The ovary in the dry specimen is 3/4 inch long, the lower, naked part of tube 1 inch, the upper staminiferous part 3/4 inch long.

Thurber says it is never over 4 inches long

Upper sepals fleshy, greenish white, 3/4 inch long, below 2, above 4 lines wide; free part of petals (light creamcolour) 1 inch long above 6–7''' wide, ~~contracted~~ very curly, very thick ~~or leathery~~ and fleshy

filaments light yellow, adnate to the upper half of the wider tube, the lower rather rose;

Anthers 0.8 to 0.9 l. long linear, at apex and base emarginate; style not seen; the drawing represents the numerous stigmata (15 – 20 ?) as suberect and 1/2 inch long; of green colour.

see pag. 168 The fruit ~~before me~~ ~~has been~~ preserved in Alcohol is obovate, 2 1/2 inches long by 1 1/2 in diameter, beset with about 30 scales and short brownish wool in their axills but no spines. * The rind of the fruit, 2 lines thick, is hard (whether by the action of the Alcohol? (yes) and as Mr Thurber informs me, bursts open on the plant in 3 or ~~mostly~~ 4 irregular valves, separating completely from the ~~red~~ crimson rather insipid pulp, which has the consistency of a fresh fig & drying up from the heat of the sun, separates and falls to the ground ~~and is there~~ when it is collected by the natives and rolled into balls which keep several months; or pressed ~~out~~ for the thick molasses like saccharine juice which it contains.

* The colour is green and towards the summit reddish when in nature.

* the remains of the flower have fallen off, leaving a broad convex scar

(The fruit in the drawing is represented as being 3–4 inches long, and 1 3/4 to 2 in diameter, and of a more oval shape). too large & long, Thurber says

The inside of the pericarp is also red.

Mr Thurbers ~~notes~~ further states that the species appears to have a wide range, from north of the Gila River ~~South~~ into Sonora, and within 20 miles of Guaymas on the Gulf of California. It doubtless also ~~occurs~~ in ~~Sonora~~ California, according to Vanegas, who in his history of the Peninsula, published 100 years ago, states that the fruit forms an

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of the eastern Coast

an important article of food to the natives and that the harvest time was a ~~period~~ seasons of great festivity

see for continuation page 168

Another evidently nearly allied species was collected with the foregoing in northern Sonora, about Arispe, Magdalena and through all that region. From Mr Thurbers meagre notes and the half of a flower before me I give the following description:

see pag 290

Cereus Thurberi erectus, elatior, e basi ramosus; ~~costis~~ sub-14-costatus sulcis parum profundis aculeis brevibus, nigricantibus; floribus tubuloso-campanulatis virescenti albidis; ovario globoso sepalis 80-100 ramosis triangularibus acutis imbricatis ad axillam villosis stipato; sepalis tubi inferioribus 24 lanceolatis acutiusculis, axilla nudis; superioribus 20-25 orbiculato-obovatis obtusis; petalis 16-20 obovato spathulatis, obtusis crassis

Collected in June 1851 in a rocky Cañon near ~~Arispe~~ the mountain pass of Bacuachi a small town on the road to Arispe Sonora. Stems 4 to 12 feet high branching from the base. Branches 6-10 inches in diameter with about 14 ribs, sometimes articulated, occasionally branching above, grooves between them shallow; flowers greenish white, about one foot below the summit of the stem, Dried flower 2 3/4 inches long tube narrower, more elongated than in C giganteus; globose ovary ~~4 l. long~~ and naked and staminiferous part of the tube each about 3/4 inch long; free part of petal 9''' long, about 4''' wide

It was afterwards met with about 30 miles from Sta Cruz with Cereus giganteus, and it abounds near Magdalena and Ures It does not appear to extend northward to the Gila, Santa Cruz being its northern limit.

anthers much larger than in the foregoing species, 1.3 to 1.4 l. long; style not seen. No fruit was observed nor specimen of the plant obtained. —

Notwithstanding these incomplete data it is evident that C. Thurberi is nearly allied to C. giganteus. Both have an erect stem, of considerable hight, both have flowers with short tubes, a ~~great~~ half ~~part~~ of which is naked, the stamens ~~only~~ occupying only the upper part of the tube; both have short fleshy sepals on the ovary with short wool ~~in~~ their axills; without any bristles or spines; in both the petals are whitish, very thick and fleshy and obtuse ‡

These plants, and especially C. giganteus which we ~~know~~ better than C. Thurberi stand very near the Pilocerei by the greater hight, and by the short and rather ventricose tube of the flowers, and the thick fleshy petals; but + the seed is very different at least from that of Pilocereus senilis (the only species of that genus which has been well examined, I believe

+ but as they have not the least indication of a Cephalium nor of any peculiar development of wool, their flowers spring from the axills of the ordinary and unaltered bunches of spines — and the seed see above +

~~which has the those~~ the seeds of which are obliquely thimble shaped, densely dotted, embryo with thick globose cotyledons. It is said that the filaments in P. senilis cover the whole inner side of the tube and even the ovary; this, if true would constitute another difference between this and

‡ It is improbable that not these species have to be classed near the Chilian velvety Cerei (velutini Prince Salm). The flower of what appears to be Cereus chilensis Pfr., obtained near Valparaiso and figured by Mr Agate of the U.S. Exploring Expedition greatly resembles the flower of C. Thurberi; the flower has the same shape, tube rather short and gradually widening, ovary covered with about 100 imbricated scales (in the drawing apparently naked — but the axillary wool may not have been very distinct to the Artist. — The tube has also about 100 scaly sepals; the white petals are acute; (whether fleshy?) these last characters only appear to distinguish it from C. Thurberi. —

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our plant, where the lower half of the tube is ~~fr~~ naked. — In examining a number of specimens of Cereus §Echinocereus and of Echinocactus I always find a small part of the lower part of the tube free, the filaments being adnate ~~up to~~ to some distance above the ovary.

~~Compare~~

see pag 166 Cereus giganteus (Thurbers notes Nov 19th 1853)

The youngest plants, Mr Thurber noticed, were 3 or 4 feet high, with narrow furrows and long spines; the smallest flowering plants had about 12 feet in height, and the tallest specimens appeared to reach 45 or 50 feet.

The flowers are produced near the summit of the plant but not on it; and the fruit is seen usually 6 to 12 inches from it.

The flower appears to be open night and day (and probably for several days in succession)

The fruit described above (pag. 165) preserved in alcohol, is unusually long; it is mostly 2-3 inches long by 1½ to 2 in diameter; colour green, reddish towards the summit; pericarp of the hardness of of a green cucumber about 2 lines thick, somewhat softer towards the apex.

The empty pericarp, after dropping the pulpy contents looks at a distance like a flower and probably has given the idea to ~~[illegible]~~ the natives that the flower is red

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Cactaceae collected and figured by the U.S. Exploring expedition. 1839.

1. Cereus chilensis Pfr.? erectus, crassus, obtusus glaucus sub 13 costatus; costis rotundatis inter areolas 9 lineas distantibus ~~transversim impressis~~ crenatis v interruptis; sulcis ~~acutis~~ angustissimis acutis superficialibus; aculeis ~~rectis, rigidis~~ robustis, annulatis v?, exterioribus ~~debilioribus~~ fuscatis, minoribus 10-12, interioribus 3-5 ~~longioribus~~ majoribus validis; flore 5 pollices longo, ~~2 pollices in diametro~~ tubo sensim ampliato, limbo pollices 2 in diametro; Ovario subgloboso squamis ~~sub 100~~ sepaloideis sub 100 ~~stipato~~ imbricato, tubo sepalis sub 100 sensim majoribus infra triangulatis, supra lanceolatis acutis virescentibus, apicem versus rubellis stipato; sepalis superioribus sub 18 ovato-lanceolatis acutis extus e fusco rubellis; petalis 16-18 acutis, mucronatis albis. —

~~Lima~~ Valparaiso, collected and figured ~~July 2.~~ 1839. The fragment figured is 7 inches high, and 3 inches in diameter; The plant appears to be well characterized by the interrupted, rather tuberculate ribs, which are broad and obtuse and separated from ~~the~~ one another by a very narrow and sharp ~~and compressed~~ groove. The convex tubercles which form the ribs resemble somewhat those of many cylindric Opuntiae; they are 9 l. long 6 wide and bear towards their upper end an circular areola 3 l. in diameter, with 12-16 stout straight spines, exterior 4-6, interior ones 6-8 long. —

Flower sessile above the areola in the transverse incision between the tubercles; curved upwards. Ovary 9-10 l. long and nearly the same diameter, tube over 3 inches long

0 1 2 3 4 5 6 7 8 9 10 cm copyright reserved MISSOURI BOTANICAL GARDEN

gradually widening at top; petals 4 or 5 lines wide mucronate; white.

This is probably C. chilensis Pfeiffer var polygona Salm — vide Cacteae etc pag 199 It belongs to a section of Cerei which have all a ~~somewhat~~ more or less velvety surface Series Salm's section Sulcatae velutinae. They are all from Chili and the neighboring countries; of none of them flowers appear to have been seen or described yet

If the drawing is quite reliable ~~our~~ plant has more ribs than any others of this Section with the exception of C. chilensis polygonus, which is said to have 15 ribs. — C. chilensis is however is described as having ~~wide~~ shallow (flat) grooves; while ~~our~~ form has very narrow ones; which possibly means nothing different

Mammillaria ~~limensis~~ ~~n. sp.~~

probably not distinct from M. flavescens DC. see below

caulibus pluribus ovato-subcylindraceis e radice crassa carnosa, aculeis setaceis rectis, semipollicaribus fuscis; floribus verticalibus pollicaribus s. ultra, ~~flav~~ ~~luteis~~ flavis; sepalis ~~exterioribus~~ lineari-oblongis, obtusis, patulis reflexisve, sub 20 petalis sub 20 ovato-oblongis subobtusis stylo viridi, stigmatibus 9 radiatis.

Lima, Peru, July 2d 1839.

— It is impossible to make out from the drawing number of spines, or the shape of the tubercles; so that this species can not be fully described from the materials but must for the present remain loosely indicated. — Almost all the Mammillaria belong to Mexico, a very few are from the north, a few from the westindies, and from North eastern and eastern South america. I found none described from Peru or Chile, so I venture to indicate ours as a new species. —

The stems several from the same fleshy light brown root, are 2 1/2 – 3 inches high by 1 1/4 to 1 1/2 inch in diameter; spines apparently brown setaceous, and 4–6 l. long;

Flowers 14 l. long, & 9 l. in diameter sepals greenish red interior ones and petals deep yellow, 2–2½ l. wide; 9 short stigmata greenish yellow.

Compare however Mam. flavescens DC & Mam. nivosa Lk & Otto

On further examination it did seem improbable that this species should be Mam. flavescens DC which is said to occur through the tropical parts of South America; it is frequently cultivated in Europe and the flowers are often observed they are said to appear in rings around the vertex, while in our drawing they appear vertical. But this may not be an essential difference, as little as the golden yellow spines, while ours are coloured brownish. —

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Dec 1853

Further notes on Cereus giganteus E. of southeastern California ~~and another allied sp.~~

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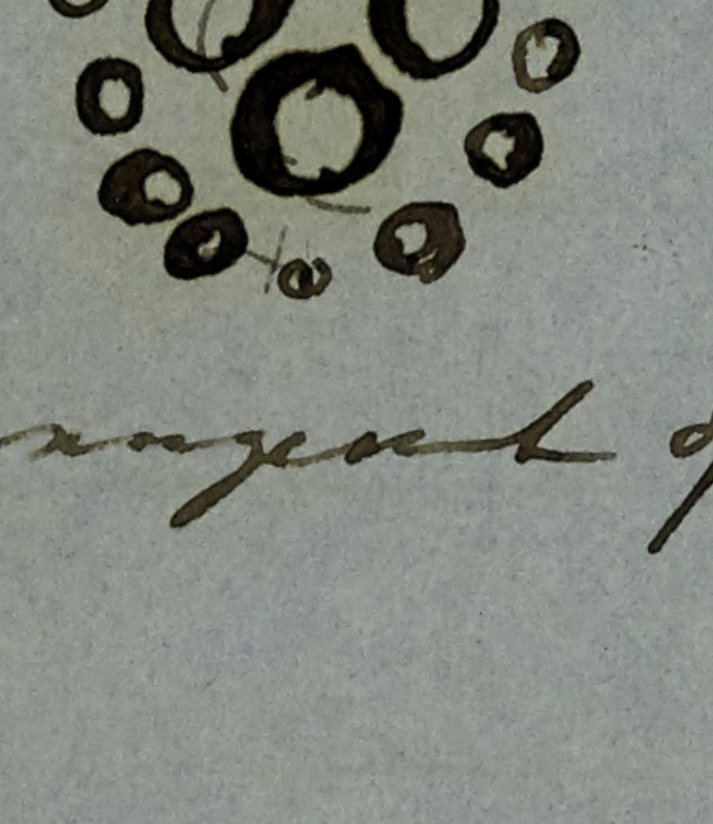
Specimens of flower and fruit together with interesting notes and drawings ~~kindly~~ communicated by Mr George Thurber and ~~specimens of spines~~ a section of ~~the~~ a rib of the plant, with spines, presented by Dr Parry enable me ~~still more~~ to perfect if not to complete the history of ~~this~~ this giant Cactus.

Erectus, elatus, simplex vel saepius parce ramosus; ramis erectis, caule cylindrico versus apicem sensim attenuato, candelabriformibus brevioribus; vertice applanato, tomentoso; costis ad ~~basin~~ caulis sub-12 versus apicem 18-21 rectis, ~~acutatis acri~~ ~~obtusis~~ obtusis ~~versus basin~~ vetustioribus versus ~~ad~~ caulis basin obtusissimisque ~~supra acutatis~~ x subrepandis, sinubus (profundis) ad basin caulis latissimis, versus ~~apicem~~ angustioribus, angustissimisque acutis, areolis prominentibus (orbiculato-ovatis) junioribus albido-tomentosis; aculeis rectis basi valde bulbosis tenuiter sulcatis, angulatisque, albidis, demum cinereis; radialibus 12-16 imo summisque brevioribus, lateribus (praecipue inferioribus) longioribus robustioribus, ~~subinde~~ cum aculeis adventitiis ~~paucis~~ setaceis summo areolae margine adjectis; aculeis centralibus 6 robustis, albidis basi nigris apice rubellis demum totis cinereis, 4 decussatis, quorum infimus longissimus robustissimus, deflexus, 2 superioribus lateralibus inferioribus brevioribus; floribus vide pag 164 bacca do

x supra ~~acutatis~~ e basi lata acutatis, acie obtusatis



Arrangement of spines

See pag 425 This species has according to Mr Thurber a wide range pag 165

Fl. May & Jun. fr. ripe July & Aug. Mr Th. coll last flowers in the first days of July. ripe fruit same time

The youngest plants pag 168

The ~~ligneous~~ fascicles+ correspond as Dr Parry has finally satisfied himself, and as indeed is the case in all Cerei, with the intervals and not the ribs of the surface. From between these bundles the

(One of which obtained by Mr Thurber has 1½ inch in diameter) lignuous fibres ~~spread~~ radiate horizontally towards the ribs and especially the areolae.

At the base of the stem the ribs are broad, obtuse, with broad and shallow intervals, ~~bare and destitute of spines~~. Upwards the ribs are ~~somewhat compressed~~ triangular, rounded or obtuse with deep, acutish grooves between them; towards the top the ribs are equally obtuse but quite compressed, the grooves deep and very narrow.

Areolae obovate, 7 l. long, nearly 6 in diameter, ~~Spines coming off in one bunch~~ lowest ~~radial~~ and upper radial spines 6-12 l. long lateral ones, ~~especially~~ (the lower ones 12-18 l. long, longest) 4 lower central spines decussate, straight or very slightly curved downward 20-30 or more lines long; 2 upper ~~central~~ spines 15-18 l. long. The stoutest spines have one line in diameter, while the bulbous base is fully twice as thick. The old spines together with the areola readily come off in one bunch; but generally the 6 central spines fall off first, leaving the radiating ones appressed to the stem; ~~till~~ ~~then~~ the lower part of the stem they also fall ~~off~~ away. ~~Dry flowers vide pag 165 and~~

The flowers are produced near the summit p. 168

The dry flower pag 165

The fl. appears to be open day & night and probably several days in succession

The fruit p. 165. 168

C. Thurberi pag. 166.

All this has been sent to Silliman Journal where it is published March 1854

slightly bitter (B.)

the taste of this plant is bitter Bigelow!

A young specimen of C. giganteus was brought March 1855 home by Dr Bigelow, who has ascertained the range of this species to be much further north than we knew before. The specimen is 6'' high, clavate, in the greatest diameter 3½ inches 14 ribs subacute, about 8-9 l. deep, grooves sharp; areolae ½ inch distant, l. in diameter — 14-16 rad. sp. 4-9''' long lateral & lower longest, uppermost shortest central 4, with 2-3 upper additional ones, ~~lowest~~ stouter & a little longer than the radial spines and very bulbous at base, lowest one deflexed, 10-12 l. long

~~March~~ 1855

march 1855

Echinocactus Whipplei

ovato-globosus; costis 13-15 obliquis, interruptis, tuberculatis ~~approximatis~~, areolis orbiculatis approximatis; aculeis ~~omnibus~~ ~~subaequilongis~~ ~~plerumque curvatis compressis~~ radialibus 7 compressis, albidis ~~[illegible] inaequalibus~~ ~~valde inaequalibus~~ ~~lateralibus~~ 3 inferioribus brevioribus, 1-2 ~~supremo deficientibus~~ ~~lateralibus longioribus mediis longioribus~~ ~~summo latissimo, longiore~~; ~~aculeos radiales superantibus~~ centralibus 4 ± ~~junioribus fuscis~~, demum ~~3~~ compresso 4-angulatis rubellis, 2 ~~superioribus~~ lateralibus rectis sursum divergentibus, inferiore ~~latiore~~ robustiore deorsum hamato; — fl.? ~~fr.~~? [sem. ~~nigris opacis~~, oblique globoso-obovatis ~~basi acutiusculis~~ dorso rotundato basin versus acutiusculam acute carinato ~~opaco~~ opaco, nigro, minutissime verrucoso-tuberculato, hilo majusculo, orbiculari]

~~Supra deficientibus~~
~~3 inferioribus~~
~~summo radiali aequalibus~~
~~complanato albido~~
× summo complanato, albido recto ceteris plerumque longiore compresso 4 angulatis ~~?~~ ~~rubellis~~
~~lateralibus rectis~~
see above ±

Dr Bigelow discovered this species on the ~~Little Colorado~~ Creek, in sandy plains, Dec. 3d 1855. At first only dead specimens were found, afterwards also young living ones (which I have not seen). It was not observed after leaving the valley of the Colorado Chikito.

Lithodendron Creek near the Colorado Chiquito about 90 miles west of Zuni

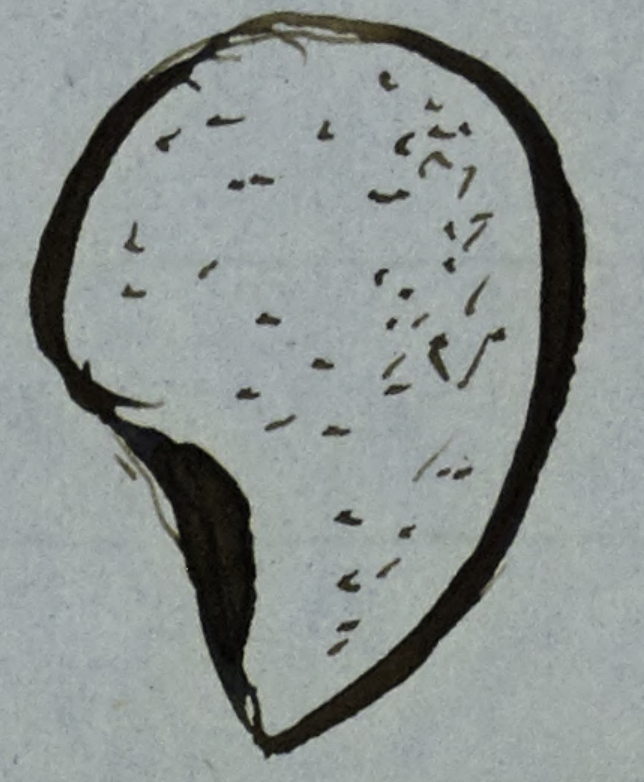
The plant is described by Dr Bigelow as being globose-ovate, about 3-5 inches high ~~with 13 ribs~~. The outer spines are ~~slightly~~ recurved or straight, 6-9 l. long, × ~~with the exception of the very broad uppermost one which is 12-18 l. long and ½ to 1¼ l. broad. This species seems to form the 4th central spine, but in position as well as colour & shape it belongs to the exterior series. The~~ ~~4 central or central spines are equal in length (12-15 l. long) and of a reddish (and when they get old, ashy) colour. the lower one is curved downward~~ they are somewhat ~~(4 angular, narrower) curved and~~ 2, ± nearly equal often more curved, dark-

× ~~the lower~~ ones shorter than the lateral and upper ones: the two lowest lateral spines are darker the other 5 white. The upper central spine is the longest and broadest of all 12-18 l. long & ½-1¼ l. broad, mostly straight, directed upwards, and almost forming a circle with the ~~other~~ radial spines which join it on both sides. The 3 other central spines a little are shorter, 12-15 l. long,

brown when young, with lighter tips, afterwards ~~reddish~~ and finally of an ashy colour 175
~~than the radial spines~~, all & the lowest one

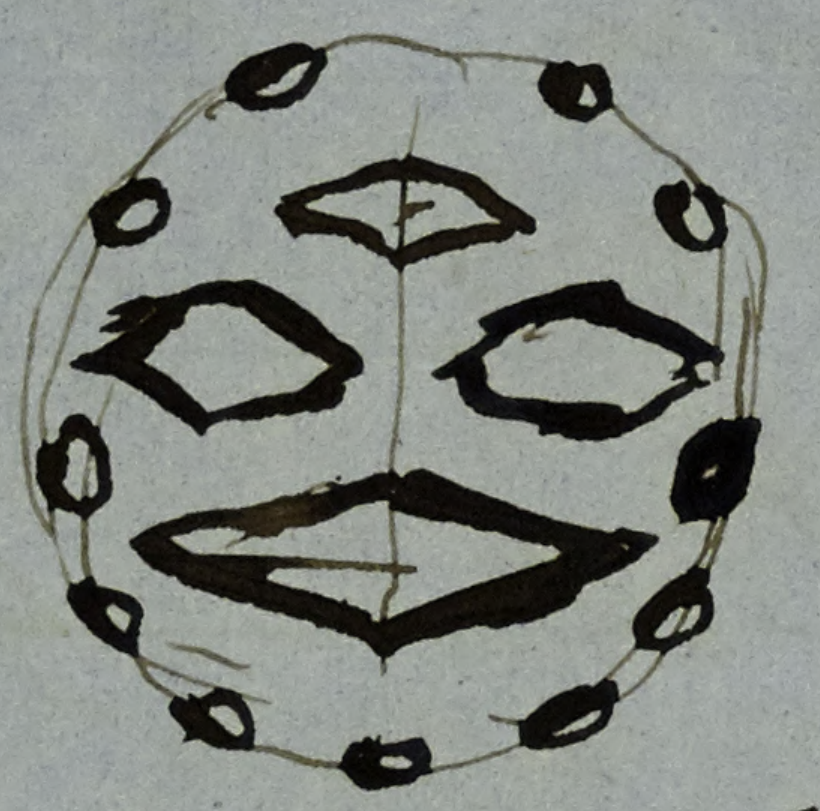
has a very sharp recurved hook, which is whitish on the outside of the curvature, much like the hook of E. pulchellus

Among the debris of the dead specimen preserved by Dr Bigelow a number of seeds were found, which no doubt belong to this species. To the character above given I only add that they are very little compressed and 1.6 – 1.7 lines long and 1.2 l. in diameter.

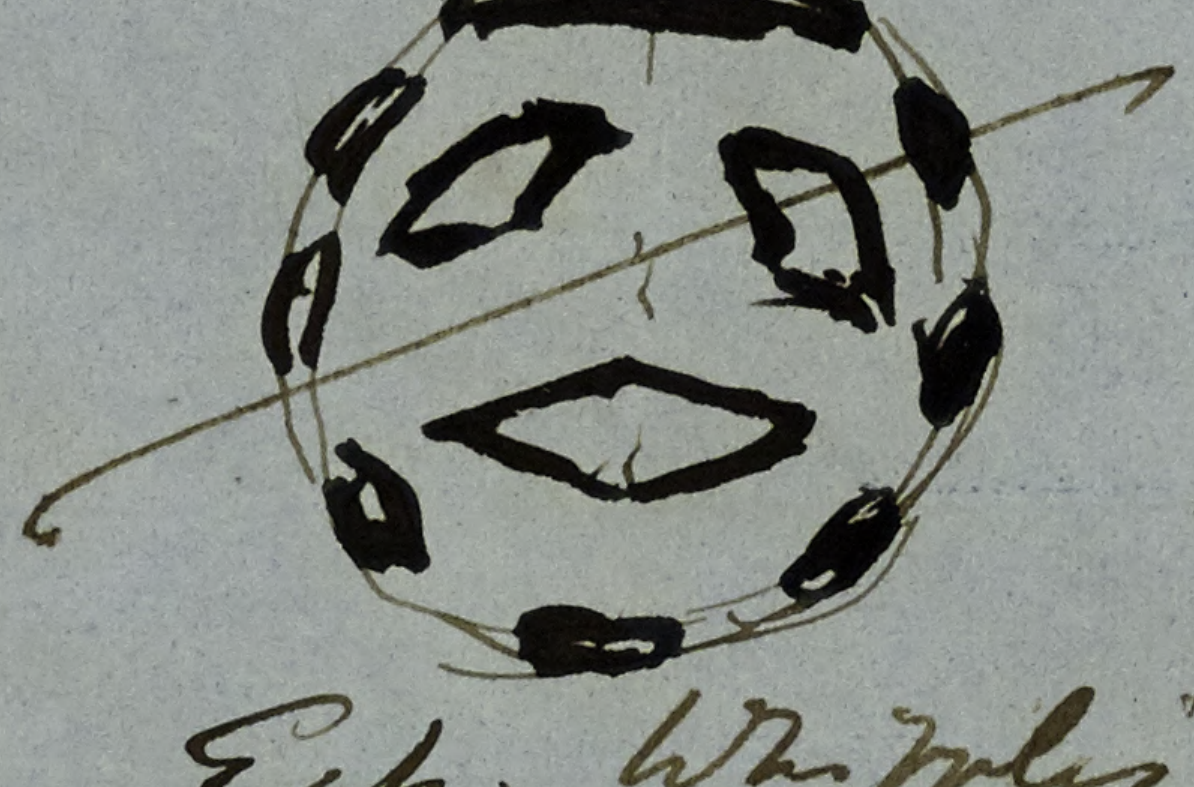


This fine species seems to approach very nearly to the Echinocacti hamati, found in numerous forms on the middle and lower Rio Grande; and more nearly to E. brevi~~formes~~ hamatus, the seeds of which are as yet unknown to me. But it is easily distinguished by the arrangement of the spines. The latter species has 11 radial spines, all around and 4 central ones, all angled, and the uppermost of these shorter and weaker than the two lateral ones; upper most or 12th radial spine mostly wanting.

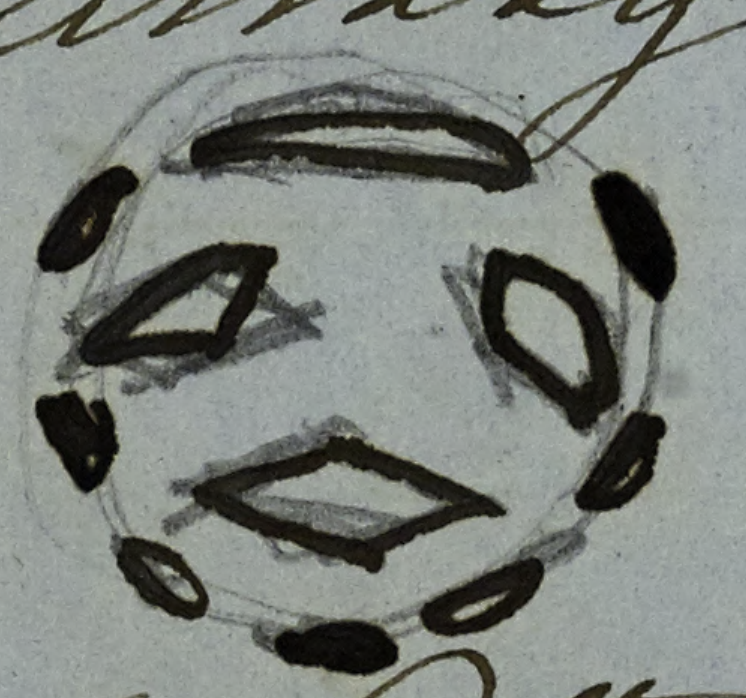
arrangement of spines.



Ech. brevihamatus

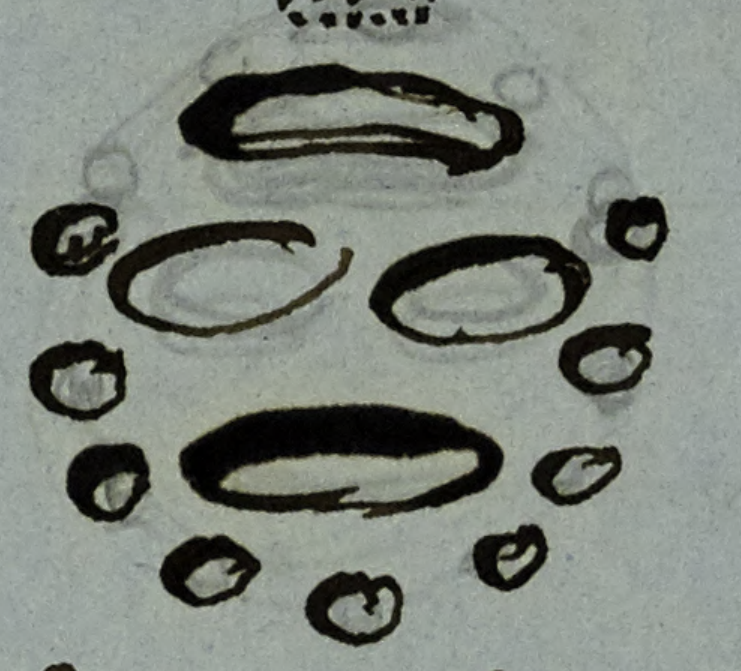


Ech: Whipplei



better

Echinocactus bicolor (specimen fr. Mr Potts, Chihuahua) is ~~evidently nearly~~ somewhat allied to the new species; but lower central spine never hooked; ribs very broad etc. 9 radial spines, none on the upper part of areola: (rarely one flat one above the upper central one.



Ech. bicolor

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Mamillariae hamatae.

~~a~~ aculeis radialibus sub 12

1, **M. Goodrichii** Scheer globosa s. ovata, subsimplex vertice tomentoso, tuberculis ~~ovato~~-globosis-ovatis, ~~ad~~ axillas juniores lanatas setigeris, aculeis radialibus (11–15) sub 12 ~~v. 13~~ intertextis albis apice fuscatis, centralibus ternis quaternis ve × ~~atro~~fusco-atris, superioribus divergentibus rectis (rarissime subuncinatis) inferiore paulo longiore robustiore ~~deorsum~~ uncinato.

× (in plantis junioribus subsingulis)

floribus in vertice lateralibus

Collected by Dr Parry at San Diego California and no doubt identical with the plant brought from the ~~California~~ island of Cerros to England and named there *M. Goodrichii*. One of Dr Parry's specimens is about 2 inches high and 1½ inch in diameter; the other is globose, rather depressed. × ~~The radial spines 2½–3½ l. long; the uppermost one present or wanting.~~ The tubercles 1½ to 2½ l. long and of a somewhat ~~rather~~ corky texture so that the dead ones do not shrivel up; in their axills a dense wool is found together with 5 to 8 ~~long~~ bristles, which often reach the length of the tubercle. The same peculiarity I have observed in M. Grahami. The radial spines are 2½–3½ l. long, the uppermost one present or wanting; the upper central

× they

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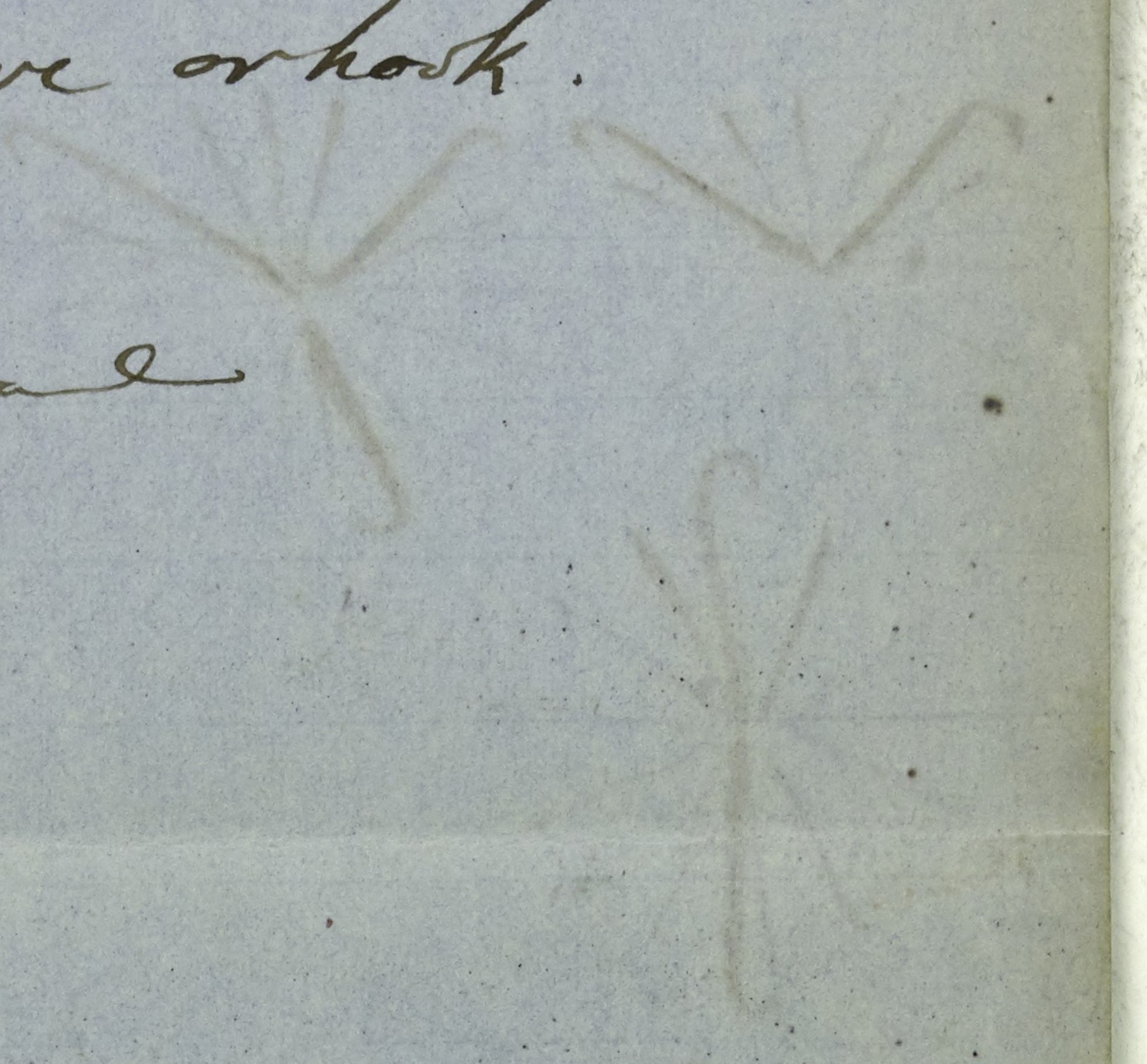
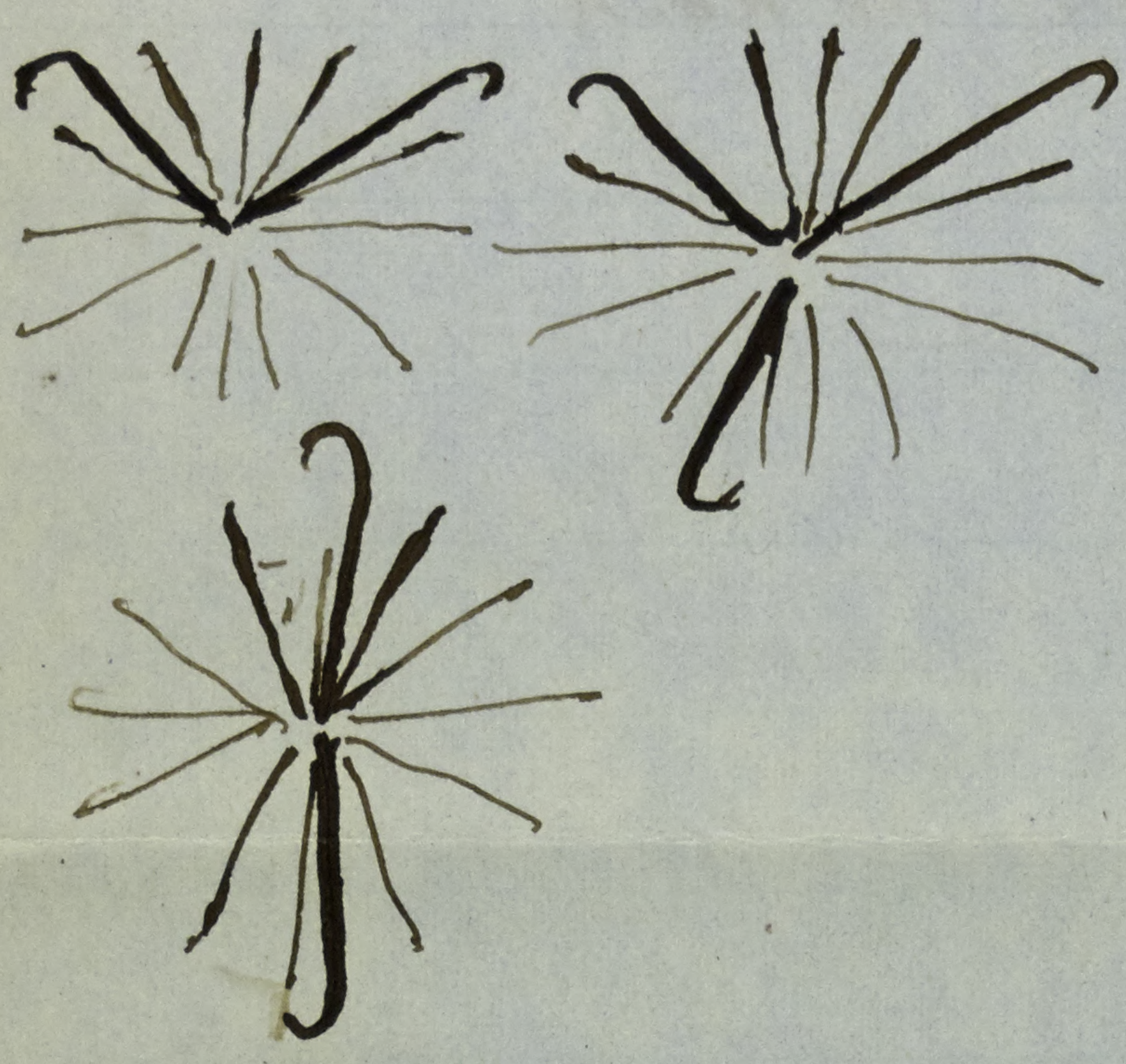
spines 2, divergent, ones or 3; hardly longer than the lateral ones, straight or rarely in my specimens with an inclination to curve or hook. The lower central spine is the longest one 4½–5 l. long; the (narrow or rarely wider) hook is bent upward or sideways, Flowers yellowish white, ½ inch in diameter



2, **Mam. ~~dianeistra~~ Wrightii** E globosa s. depresso-globosa, simplex, tuberculis longioribus cylindricis, teretibus axillis nudis aculeis radialibus subaequalibus sub-12 (~~11–13~~) albidis 3–5 summis robustioribus, apice fuscatis, lateralibus paulo longioribus, inferioribus gracilioribus, aculeis centralibus ~~subbinis~~ divergentibus ~~the~~ uncinatis, fuscoatris, radiales sub aequantibus; floris sepalis lateralis? exterioribus triangularibus, obtusiusculis, fimbriatis sub 13 interioribus margine ~~ciliatis~~ petaloideis acutis sub 8 petalis (purpureis) linearis lanceolatis acuminatis aristatis, sub 12; bacca succosa globosa ovata, magiuscula purpurascente ~~coronata~~; seminibus obovatis basi acutis, nigris, scrobiculatis.

New Mexico, Coppermines, west of the Rio Grande (Wright) 1851 on the Pecos, Anton Chico etc (~~Wright~~ Bigelow 1853). Plants 1½–2½ inches in diameter tubercles 5–6 l. long; spines 4–6 l. long, (shorter in Wright's, longer in Bigelow's specimens) see next page ± Flowers (lateral?) (a withered flower found in Wright's a fresh living flower on B's specimen) about 1 inch long, petals and margin of inner sepals bright purple. Berry as reported by Dr B large & purple seed (from of Wr's specimen) similar to that of M. Grahami, but much larger, 0.7 l. long.



‡ uppermost radial spine stout, with brown tip or smaller and slender, or wanting; central spines 2 side by side, or rarely one ~~above~~ the other. sometimes only one not rarely 3, the third one being below the 2 others, hooks directed ~~outward~~ or in different directions.

b. *aculeis radialibus 20-30 uniseriatis*

see page 128 3. *M. Grahami* globosa, demum ovata, ~~ov~~simplex (s. e basi parce ramosa); tuberculis ovatis basi dilatatis, axillis nudis, areolis orbiculatis, s. ovato-orbicul. aculeis radialibus uniseriatis sub 25 (20-30) albis saepe apice fuscatis, summis brevioribus, lateralibus longioribus; centrali singulo ~~robu~~stiore sursum hamato, saepe duobus rectis sursum divergentibus additis. omnibus e basi pallida fuscatis; fl. *pag* 275 bacca ovata coronata, sem. minutis pyriformibus, scrobiculatis nigris.

Eastern slope of the mountains about El Paso & southward Wright, Bigelow; On the Gila Parry ~~San Francisco~~ Mountains east of the Rio Colorado Dr Bigelow — This species is one to 3 inches high & 1 – 2½ in diameter, simple or somewhat branching from the base only; tubercles 3 l. long and when old of a corky texture, persistent when dry like those of M. tuberculata, — 13 or 21 spiral rows.

Radial spines in some smaller specimens 25-30, in larger ones often only 20-25, lateral ones the longest, about 3-4 l. long, in the largest specimens even 5-6''' long, lower ones shorter and upper ones the shortest & most slender. In smaller specimens only one central spine is observed, but often ~~mostly~~ one or generally 2 upper straight central spines are present, not so dark nor so long (3-8''' l.) as the hooked one; this lower one has mostly a wide, sometimes a narrower hook, curved upwards, and is from 5 ~~to~~ 9 l. long. — The fruit was found lateral, below the top, and is an oval (green?) berry with very minute (0,4 l. long) seeds, apparently about 6 l. long.

~~for balance see pag 128.~~ see also pag. 181

c. aculeis radialibus plurimis 2-seriatis.

4. M. phellosperma (~~M.~~ M. tetrancistra in part see pag 97)

ovata, s. ovato-~~cylindrica~~, simplex s. ~~[illegible]~~ e basi ramosa, tuberculis ovato-cylindricis; axillis ~~juventute~~ lanatis setigeris, demum nudis, areolis orbiculatis, aculeis radialibus biseriatis, numerosissimis (40-60) exterioribus brevioribus, tenuioribus albis, interioribus apice fuscatis, centralibus 3-4 robustioribus longioribus ex basi pallidiore atrofuscis, superioribus rectis s. rarius uno alterove hamatis, inferiore robustiore ~~hamato~~ sursum hamato; floribus subcentralibus, sepalis 17, exterioribus ~~oblongis~~ ovatis obtusiusculis, ciliatis, interioribus oblongo-linearibus, petalis acuminatis aristatis, stigmatibus 5, bacca obovata s. clavata ~~lata~~ umbilicata nuda, tenui, coccinea, subsicca, seminibus magnis nigricantibus, rugosis, tuberculatis, ad hilum ~~magna~~ massa suberosa fusca semine ipso majore arilliformi auctis.

Dry gravelly hills about the base of the Mountains east of the California Cordilleras (near San Felipe) Also near the junction of the Gila & Colorado (Dr Parry On the lower Gila (Dr LeConte)

180.

on the Mohave and between it and the Colorado (~~Dr Bigelow~~) also east of the Colorado and 50 miles west of Carters Pass. —

This interesting species was first noticed by Dr Parry & described from his notes in Sill Journ Nov 1852 pag .... under the name of M. tetrancistra. Since I have been able to compare Dr Parry's Specimens and those collected by Dr Bigelow I have found that several species have been confounded under this name, and that it is quite appropriate to none of them, wherefore I change it for one indicating the very peculiar structure of the seed; The flower described in the above mentioned publication belongs to the ~~Californ~~ M. Goodrichii; ~~and~~

This species is often simple, and ~~sometimes~~ not rarely ~~considerably branched~~, many stems from one base; young ones almost globose, older ones ovate, and ~~even~~ cylindric, 2–4 or 5 inches high 1–2 in diameter; tubercles 4–7 l. long, not as crowded as in the allied species, in 8 or at most 13 rows. In the axills of the young and even the older tubercles ~~long and in bunch~~ ~~seen~~ ~~[illegible]~~ loose wool with a few long spiny bristles is seen. (similar to M. Goodrichii). The spines in the smallest spec~~imens~~ before me number 14–18 in the outer series, 4–5 l. long, and 12–16 in the inner circle, 5–6 l. long; in other specimens I have counted from 50 to 60 rad. spines; The upper central spines in my specimens are mostly straight, 5–7" long ~~rarely hooked~~, ~~but in others they are said to be often all hooked~~, sometimes I find 1 or 2 of the longer are hooked, some specimens are said to have throughout the hooked central spines. The lower central

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is longer, 6–9 l. long, with the sharp hook always turned upwards. — I have ventured to describe the flower from a bud found in a dried specimen coll. by Dr Bigelow.

The ~~fruit~~ ~~is~~ latent ~~and~~ scarlet, rather dry, ripens the second year and is not yet ripe in the specimens collected by Dr B. in March; It is clavate or somewhat pearshaped, ~~6~~ 6–12 l. long, and 4–6 l. in diameter, the flower falls off ~~and~~ leaving a wide circular umbilicus; ~~the~~ ~~it is~~ scarlet ~~thin~~, ~~the large seed~~

Seeds large, visible through the thin ~~pericarp~~ pulp attached to conspicuous ~~white~~ funiculi, with the ~~appendage~~ 1.2–1.5 lines long – ~~seed itself 0.6–0.8~~ – diameter ~~diameter~~. The curious (arillus like) ~~[illegible]~~ spongy or corky appendage is larger than the seed itself and resembles that of the seed of Potentilla paradoxa. † Embryo almost ~~perfectly~~ globose 0.6 l. long 0.5 ~~[illegible]~~ l. diameter, cotyl. small but perfectly distinct only [illegible] & roundly, no alb. visible

† buries its lower part in a [illegible] 3 lobed cup

Apparently near M. ancistroides Lem., with 30–40 radial & 4–5 central spines, fl. & fr. unknown; seed sp. are said to be all ~~alike~~ homogenous

5. M. barbata, pag 18 & 84 aculeo centrali deorsum hamato singulo — seminibus globoso-obovatis 0.5 lin. longis, ~~tenuiter~~ scrobiculatis, fuscatis.

Seed similar to those of Mam. Grahami but larger. —

M. Grahami; see pag. 178. Judging from the number of rad. spines I find M. umbrina Ehrb. similar to our species — but it has large purple flowers. M. nigra & M. hamata have also 20 rad. spines. M. nigra seems very near our species, but has 4 central very black spines, lower one hooked 7–8 l. long.

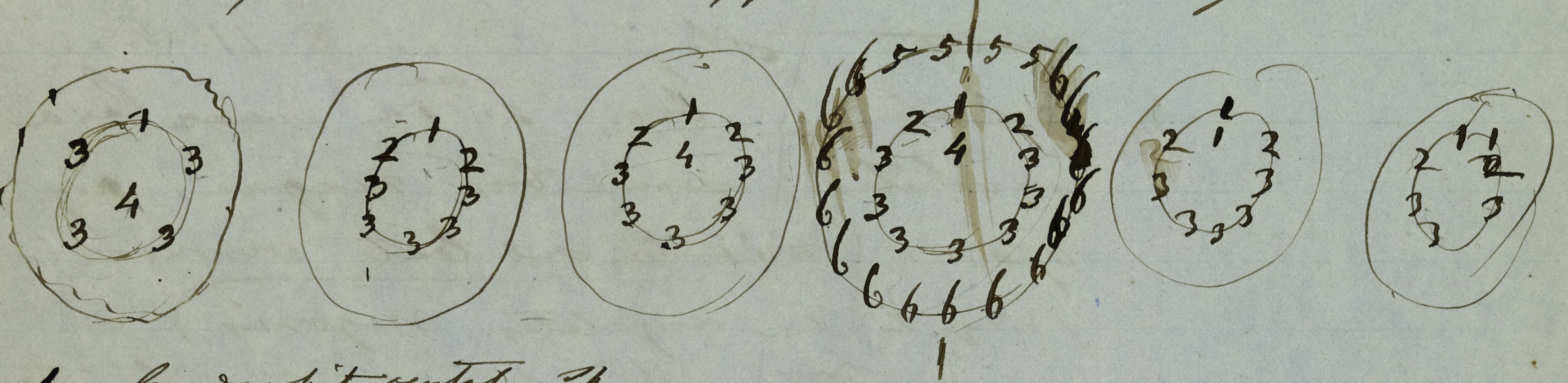
I have received ~~both~~ M. umbrina & M. nigra from Seeger, and must say that they widely differ from our plant, rad. sp. much more slender, bristle like; ~~etc~~ there is not the least resemblance in the plants!

polyancistrus ~~Engelmanni Bigel. mss~~

Echinocactus ~~polyancistrus~~ ovatus s. demum subcylindricus, costis 13–17 ~~obtusis~~ tuberculatis interruptis; areolis orbiculatis s. cum areola florifera contigua minore ovatis, junioribus ~~fulvo~~-tomentosis; aculeis radialibus ~~sub~~ 9 ~~complanatis~~ albis, summo deficiente, superioribus latioribus longioribus apice adustis, lateralibus brevioribus, inferioribus brevissimis subsetaceis; aculeis centralibus 2–3-formibus, summo subsingulo (rarius binis) complanato –4angulato, sursum curvato elongato albo apice adusto, reliquis 5–10 ~~sub~~angulatis s. teretiusculis, purpureo fuscis, 2 superioribus plerumque rectis, subinde uncinatis, caeteris omnibus acute uncinatis; floribus in axillis summis solitariis; sepalis sub 25 orbiculato-ovatis abrupte acuminatis, mucronatis crenato-ciliatis; petalis aristato acuminatis, stigmatibus 9–10

On gravelly hills and sandy plains at ~~on~~ Headwaters of the Mohave River eastern slopes of the California Cordillera one days' journey before reaching Cajon Pass coll. March 15th 1854 by Dr Bigelow. This most elegant and striking species ~~was collected~~ is from 4–10 inches high and 3–4 inches in diameter; areolae 4 l. in diameter, ~~and~~ (from center to center) 7–9 l. distant from one another the young ones covered with a reddish yellow wool; 4 upper radial spines 1–2 inches long, lateral ones 3/4–1 and lowest 1/2 inch long; The upper central spine is 3–5 inches long, and 1/2–3/4 lines wide; sometimes a second ~~similar~~ but smaller one is seen above or beside it

~~In the smallest or youngest specimens I find~~
~~only 5 bright red brown hooked~~ All the
other central spines are bright purple brown,
the upper ones longer (2 – 3 or even 3½ inches long)
the lowest not more than 1½ – 1¾ inches long,
They are all sharply hooked, the curvature
of the hook being paler, or the two upper
ones are straight. the hook is turned in different directions In the younger or smaller
specimens I find 5 brown spines, one in
the center of the others, all hooked; in others
5 to 7 or 8 are hooked, one in the centre
or not, and the 2 upper ones are straight.



1 = broad white central sp
2 straight brown central sp
3 hooked central sp. around the inner circle
4 " " in the center of the circle
5. broader & longer rad. sp.
6 other rad. sp.

The flowerbuds were just developed in the middle of March in the axills of the young halfgrown spines; one was examined and furnished the characters given above. — The flowers are vertical but not aggregated in the vertex; more in the manner of Ech. setispinus

Echinocactus cylindraceus Engelm. in ~~see pag~~ 96
Parry's California Cactaceae Sill. Journ. Nov. 1852
Ovatus s. ovato-cylindricus, simplex
s. e basi ramosus (~~paluti~~ multi-ceps) vertice tomentoso
costis sub 21 s. pluribus rectis
s. subobliquis acutis subtuberculatis;
areolis orbiculatis s. orbiculato ovatis ~~juvenilibus~~ albo-tomentosis,
aculeis robustissimis, plus minus curvatis
annulatis, rubellis apice corneis radialibus ~~5–8~~, sub 12

0 1 2 3 4 5 6 7 8 9 10
cm
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MISSOURI BOTANICAL GARDEN

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aculeis adventitiis sub 5 tenuioribus supra saepe adjectis, ~~superioribus tenuioribus~~, lateralibus longioribus; infimo brevi robusto; ~~qu~~ centralibus 4 robustioribus 4 angulatis compressis ornatis ×; floribus subverticalibus ovario ~~lana~~ nivea ex axillis sepalorum 90-100 linearium ~~lineari-lanceolatorum~~ ~~aculeato~~-aristatorum orta densissime vestito; sepalis tubi infundibuliformis 100-120 ~~lineari~~ lanceolatis, aculeato-aristatis purpurascentibus ×; petalis lacinulato fimbriatis {sub 39 ~~herbaceo-aristatis~~ flavis; ~~bacca sicca dense lanata vestita~~, ~~coronata~~ stigmatibus 8-11 linearibus acutis; bacca globosa sicca densa lana involutis; seminibus magnis nigris opacis (~~diminutius~~ sub lente verrucosis, irregulariter angulatis rugosis) embry

Dry rocky ravines near San Felipe on the eastern slope of the Californian Cordilleras, Dr Parry 1851. Dr LeConte 1852. West of the Colorado, and near the Mohave × Dr Bigelow March 1854. In my preliminary report on Californian Cactaceae in Sill. Journ. l.c. I doubtfully referred this plant to E. viridescens, but Dr Bigelows specimens prove that ~~th~~ it ~~belongs to a diffe~~ is not only very distinct from the San Diego species, though the arrangement of the spines shows some similarity, but that it even belongs to quite a different and very distinct section, the Cornigeri eriocarpi. This species has been noticed by all the observers on account of its size, its subcylindric stem ~~form~~, and ~~the~~ ~~protuber~~ its tendency to branch out from the base.

tk

hamatim decurvo

× superiore fortiore sursum curvato, inferiore longiore deorsum curvato

× intervallis margine petaloideis

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× on stony & gravelly hills fl. in early spring, Dr B. found it in fruit in March.

fruiting

MISSOURI BOTANICAL GARDEN
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March 1855

Echinocactus cylindraceus Engelm in Parry's Californian Cactaceae, (Sill. Journ. Nov 1852) see pag 96

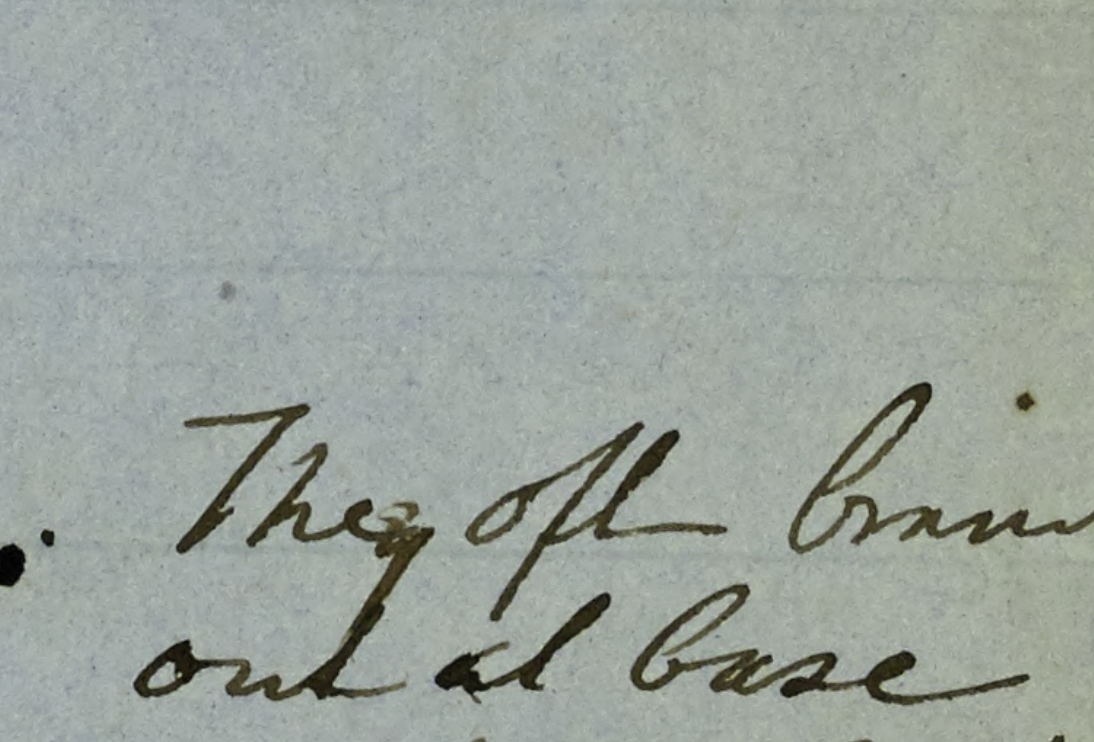
sub E. viridescens β? cylindraceus

Ovatus s. ovato-cylindricus, simplex s. pluriceps (e basi ramosus), ~~vertice~~ breviter ~~tomentello~~, costis 21 s. pluribus rectis s. subobliquis, obtuse tuberculatis; areolis ovatis, aculeis robustis ~~plus minus~~ ~~curvatis~~ compressis ~~angulatis~~, annulatis, plus minus curvatis flexuosisve, rubellis, apice corneis, radialibus sub 12, aculeis adventitiis sub-5 gracilioribus supra saepe adjectis, lateralibus tenuioribus, infimo robusto, breviore, decurvato-hamato; centralibus 4 robustissimis, 4 angulatis compressis cruciatis, superiore latiore, inferiore sursum reflexo deorsum curvato; flore flavo, bacca ~~verticalibus~~ ovato globosa, pallide virescente carnosa, sepalis semilunatis fimbriatis stipata, floris rudimentis coronata

Hab. Rocky ravines near San Felipe on the eastern slope of the California Mountains; lat. in fruit in June 1850 Dr Parry, Dr Le Conte

Young plants are ~~cyl~~ globose, older ones become ovate & cylindric; the former have 13 ribs, the latter usually from 20 to 27, and ~~grooves between the ribs acute, ribs~~ ~~about ... inch~~ the largest specimens seen were 3 ~~inches~~ feet high and 1 foot in diameter; They often branch out at base which by Dr Parry is ascribed to the action of fire. Ribs somewhat interruptedly tuberculated, tubercles flattened horizontally, ~~grooves acute~~

Spines in the youngest specimens already 7 radial and 4 central, the lowest radial sp. the shortest and much curved; the 3 upper ~~central~~ spines almost ~~appressing~~ radiating the lower one only erect all stout and 1-1½ inches long. In older specimens — the one before me has abt 4 inches



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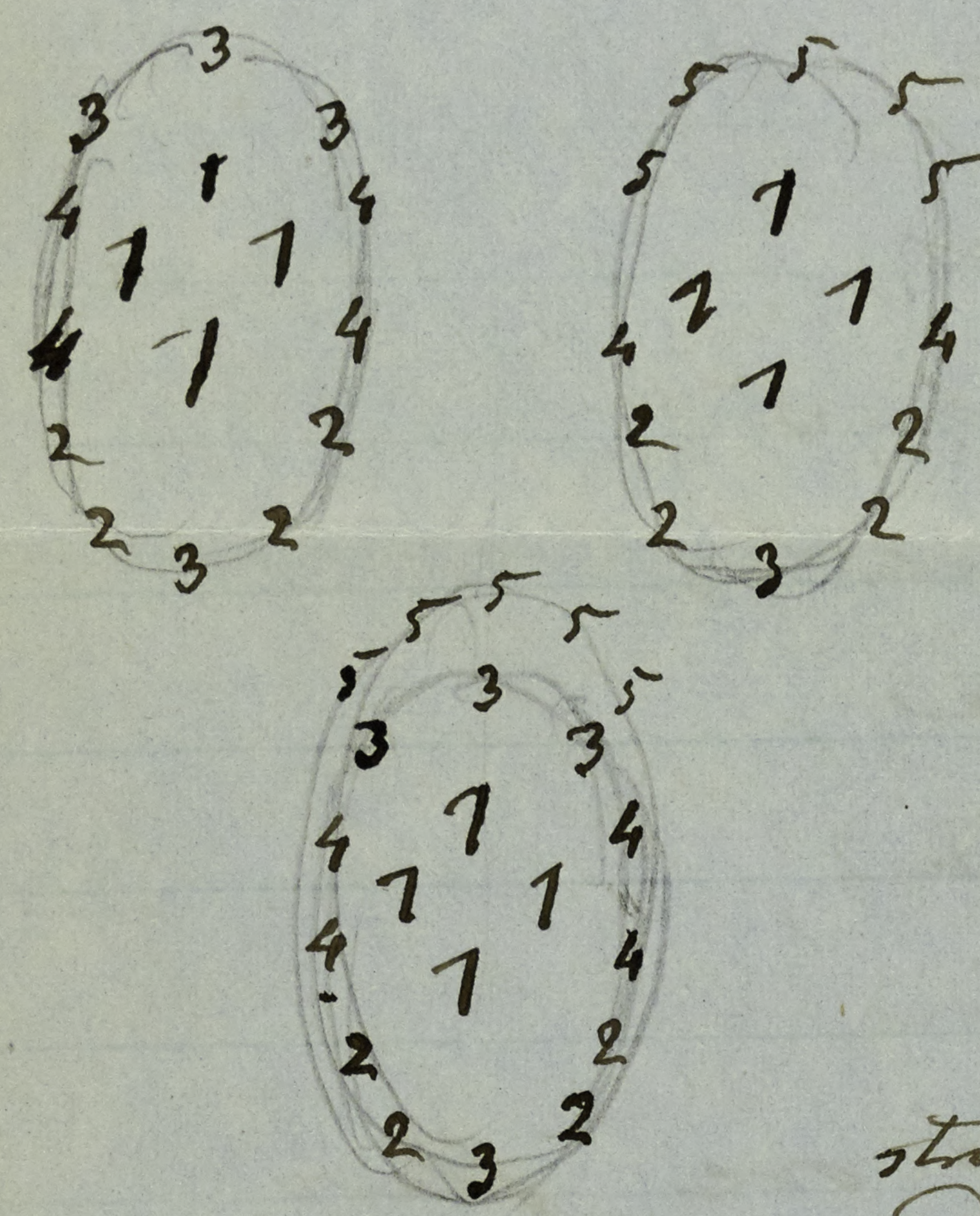
diameter and is of globose shape, with 13 ribs — the areolae are 6–8 lines long, 3½–4 l. wide, the radial spines number, with the ~~thin ones~~ on the upper edge of the areola, 12 to 18, the lowest one is stout and much hooked and the shortest of all (9–12 l. long) (slender additional ones which seem to be wanting only in the younger parts of the plant) the others are from ½ to 2 inches long the 4 central spines are 1–1½ l. broad and about 2 inches long; in the most fully developed bunches the 3 properly upper radial spines are thrown into the ~~the~~ inner circle, ~~and seem to and stand may be taken~~ so that then the number of centrals appears then 7. — The upper central is the broadest and more straight & erect, the lower is shortly strongly curved downward. The fruit is described by Dr Parry as a green, juicy berry of about 1 inch length and nearly the same diameter, situated in the axils of uppermost spines; remnants of the corolla yellow; seed black, intermediate in size between that of E. viridescens & E. Wislizeni.



polycephalus E & B.

Echinocactus Engelmanni Big. msc

globosus, (ovatus, demum) cylindricusque multiceps, (e basi ramosus ~~[illegible]~~) ventre densi tomentoso ~~13–21 costatus~~ costis ~~13~~ 21 acutis, areolis ovato orbiculatis junioribus ~~fulvido~~ tomentosissimis aculeis robustissimis compressis annulatis plus minus curvatis, junioribus ~~tomentosis~~ puberulis, incarno-rubellis ~~apice~~ nudatis rubicundis; ~~8~~ 12 (15 Big) radialibus ~~4~~ 4–8 (–11 Big) infimo nullis ~~brevioribus robustis, decurvatis~~, ~~ceteris~~ deficiente ~~longioribus~~, superioribus ~~(si extant)~~ (si extant) gracilioribus; centralibus 4 robustissimis 4angulatis compressis superiore latiore suberecto s. sursum curvato inferiore longiore decurvato; floribus verticalibus; ovario lana nivea ex axillis sepalorum 90–100 linearium spinescentium orta densissime vestito; sepalis tubi infundibuliformis 100–120 lineari lanceolatis aculeato aristatis purpurascentibus, interioribus magis petaloideis; petalis laciniato fimbriatis serrulato-aristatis ab 30 flavis, stigmatibus 8–11 linearibus acutis; bacca globosa sicca ~~densa~~ coronata lana densa involuta; seminibus magnis nigris opacis irregulariter angulatis minutim sub lente verrucosis.

Stony & gravelly hills and dry beds of torrents, from ~~2~~one miles west of the Colorado of California to about 150 miles westward, up the Mohave, latit. 35°; in fruit in the beginning of March. Dr Bigelow.

This remarkable species is ~~mostly~~ simple only when quite young, even the small globose plants show several heads from one base, and older cylindric stems have as many as 20 or 30 heads, all ~~more or less~~ pretty much of the same size; the globose ones are 6–9 inches diameter, the ovate heads ~~[illegible]~~ 12–15 inches high by 8–10 in diameter, and the largest

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‡ In the specimens before me ~~young~~ old and well developed I find mostly 6 radial and 4 central spines, rarely 1 7 radial but Dr Bigelow in his notes gives the number of radial spines from 6 to 11

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MISSOURI BOTANICAL GARDEN
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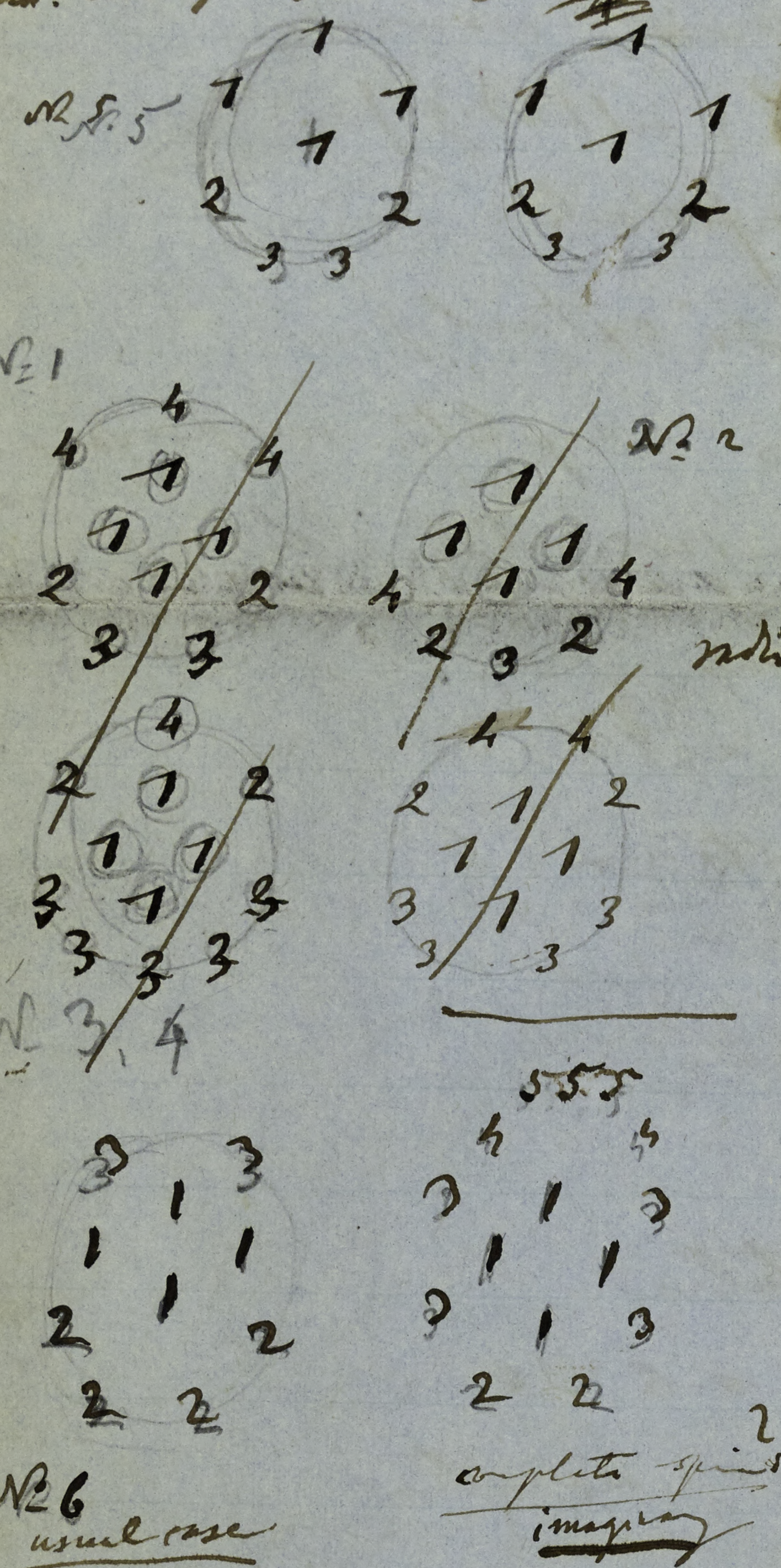
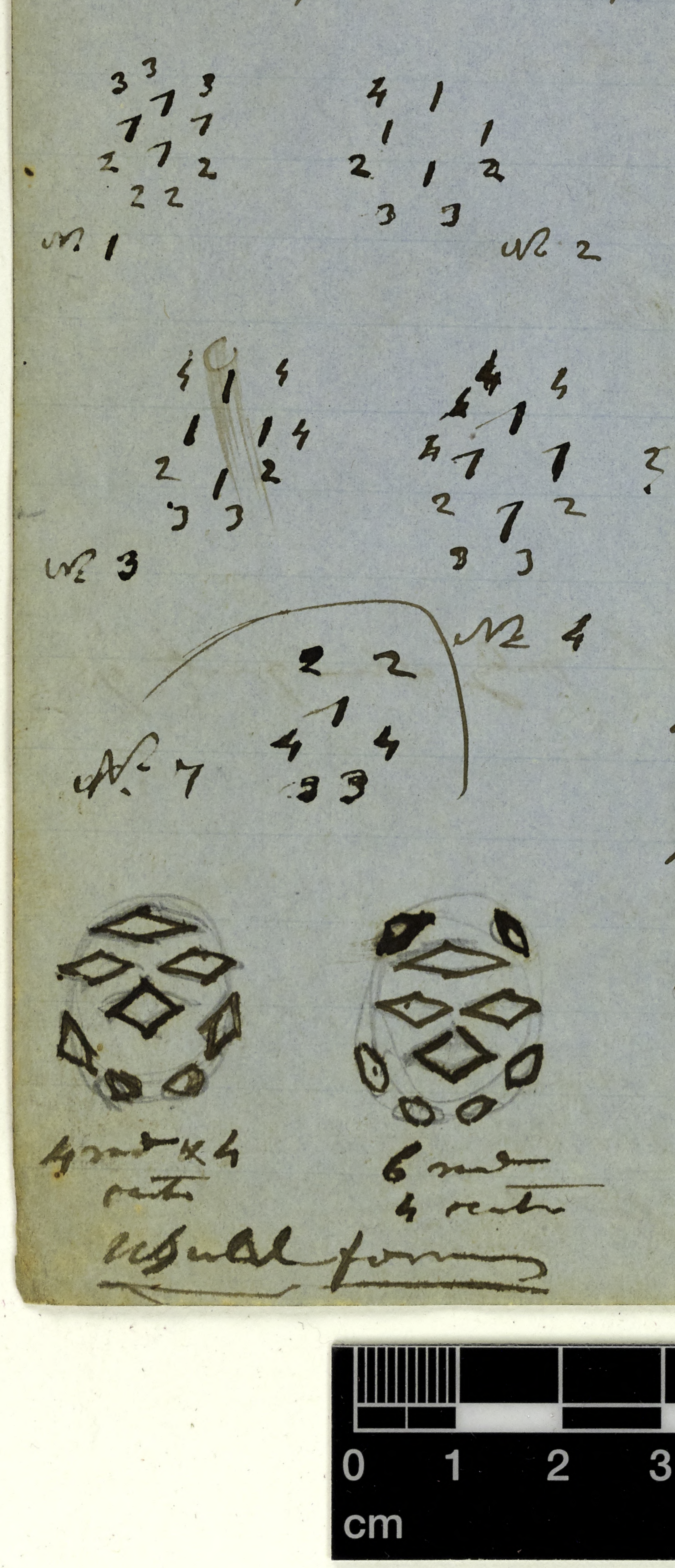
cylindric stems seen are 2 to 2½ feet high by less than a foot in diameter; Number of ribs varies, in old specimens it is generally 21. ‡ ~~The yellow flowers seem to appear in February~~ as the ~~fruit ripens in March~~. The spines in ~~the~~ the young 8 ribbed living specimen before me 7 ~~6 7 or 8~~ radial and ~~one~~ 1 central one; ~~in~~ soon the 4 upper larger spines become central and 4 ~~to 6~~ lower stouter more curved and ~~as many~~ 2–5 (or to 7 & Bigelow notes) ~~2 or 3 upper~~, [illegible] weaker and straighter upper radial spines appear, so that in the fully developed plant we find 6–9 (or 11) ~~8–12~~ radial and 4 central spines; the former are 1–2 inches long, the latter 1½ to 3½ inches long; the upper central spine is often 1½ to 2 [illegible] l. wide the lower one is the longest ‡ ~~In the young bunches of flowers being in specimens of the same species before me the upper the spine [illegible] little [illegible] it all developed so that~~ 2+

The yellow flowers seem to make their appearance in February, as the fruit ripens in March; both are enveloped in thick bright white cotton, which comes from the axills of the lower sepals ~~and through~~ which only the dark red brown spinulose points of these sepals are visible. The incomplete description of the flowers was made from dead specimens adhering to the fruit. Tube of flower exactly of the shape of E. texensis ~~funnel~~ funnelshaped, and like that, naked at the ~~lower~~ part (without stamina); petals about 1 inch long and 2 l. wide style 1 ~~inch~~ 1½ inch long, stigmata 4 [illegible] fruit dry, globose 8–10 l. diameter with the remnants of the flower about 2 inches long, open at base when falling off, like the fruit of many, if not

‡ areoles ~~about~~ half an inch in diameter; floral areoles smaller without the large spines gland found in Ech. Wislizeni and others



mostly ~~4 oft~~ only f ~~4 to 8 [illegible]~~ sp.



Cact 48.

march 1855

most Echinocacti. Seeds 2 l. long 1/2 l. broad irregularly shrivelled, appearing rugose and angular, much like those of the nearly allied E. laticostatus. Hilum transversely oval; ~~albumen large~~ embryo curved, the long cotyledons buried in the large albumen accumbent sometimes oblique.

This species and E. cylindraceus seem very similar ~~from~~ their cylindric shape, many heads ~~the~~ numerous ribs & stout ~~curved~~ red spines; but they belong even to distinct sections the former is closely allied to E. texensis laticostatus and albispinus, ~~the latter~~ ~~comes nearest to E. viridescens. But even with the fl or fruit both plants may be distinguished by the shape of the areola, and the number of spines apparently also by the shape of the ribs.~~

the latter may possibly be only a form of our plant with whiter, less flattened spines; fruit and seed are said by Dr Parry to be the same. In my specimens there are 1 lower 4 lateral and 2–3 upper rad. sp. or partly at least 4 upper rad. sp.

Echinocactus viridescens ~~Nutt~~ see pag 95. better

globosus s. depressus, simplex s. e basi ramosus, vertice depresso tomentoso costis ~~sub~~ 13 21 vix tuberculatis, areolis orbiculato-ovatis junioribus tomentosis; aculeis robustis compressis annulatis plus minus curvatis (e virescente rubellis), radialibus 12–20 infimo robusto ~~brevi~~ reliquis breviore magisque deorsum curvato; centralibus 4 robustioribus 4 angulatis compressis cruciatis, inferiore latiore longiore minus curvato; floribus subverticalibus (flavescenti-viridulis); ovario globoso squamis sepaloideis sub 25 semilunatis reniformibusve ~~ciliis~~ denticulatis imbricatis stipato

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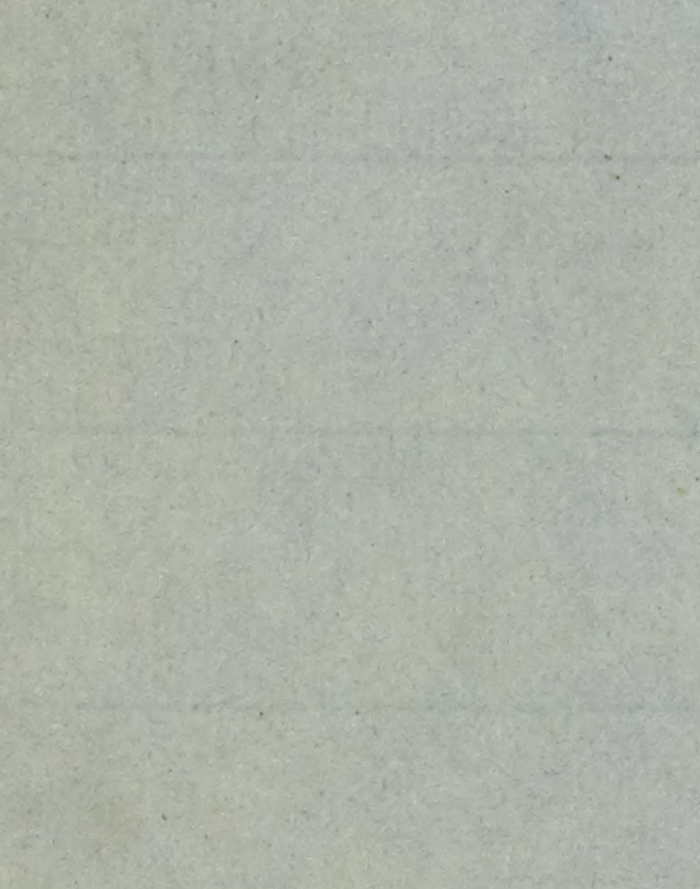
sepalis tubi 25–30 ovatis oblongisque ~~obtusis~~ ~~cum~~ petalis sub 20 oblongis versus apicem obtusum ~~angulato~~-eroso-denticulatis; stylo usque ad medium in stigmata 12–15 linearia erecta albida diviso; bacca ovato-globosa squamata (virescente), floris rudimentis coronata; seminibus nigris obovatis compressis carinatis, minutissime scrobiculatis.

San Diego on dry hills or ridges, Nuttall, Dr Parry. – According to Nuttall this plant is usually 1 foot high by 9 or 10 inches diameter; Dr Parry observed them commonly 6–8 inches in diameter by 4 to 5 high. Sometimes ("only when wounded or burned over by fires" P.) they branch from the base, forming in favorable situations quite a pile of prickly balls. In a young specimen brought home by Dr Parry, about 2 inches diameter with 8 ribs I find only 9 radial slightly recurved spines, the lowest most curved one 4–6 l. long, the 2 upper ones 6–8 l. long, ~~& a centr.~~ the 6 lateral spines 8–9''' long; the 4 central spines much stouter, more distinctly angular, compressed and annulated, 10–16 l. long, the upper one more the lower one less curved, almost straight. Dr Parry describes the radial spines of the adult plant also not more than 6–9 lines ~~and~~ and the longest central spine about 18 lines long. Flowers disposed in a circle around the ~~upper areolae~~ vertex greenish 1½ inch long 1/4 in diameter style about 1 inch long, deeper divided ~~than~~ usual



~~Claw of~~ tube inside naked at base, stamina short fruit .8-9 lin long, globose or gooseberry shaped, bluish green; ~~when mature~~ seeds 0.8 l. long.

+ in Parry's specim with 25-30 in Schotts with 35-40 scales

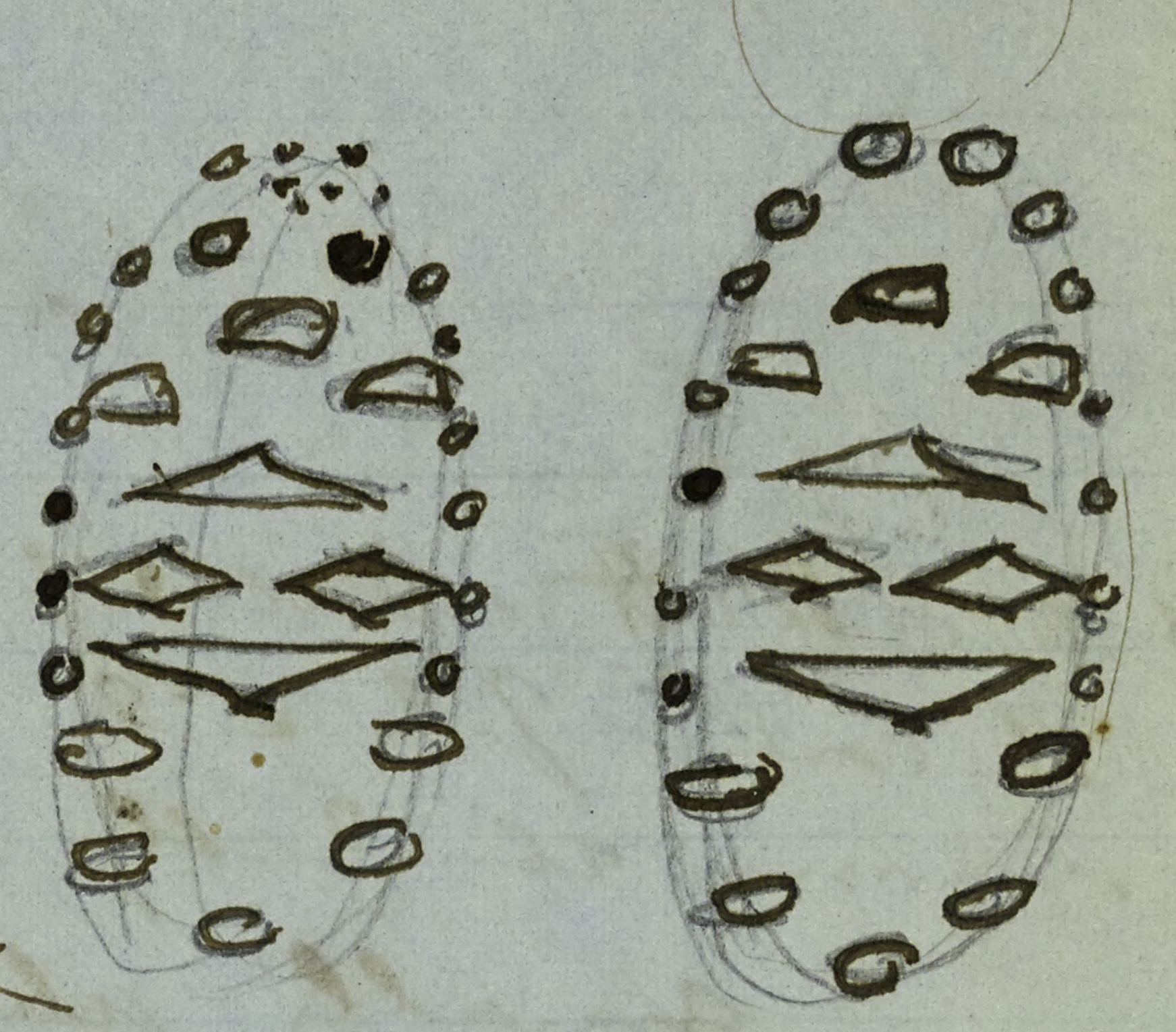
This species is ~~very~~ nearly allied to E. cylindraceus; it ~~appears~~ may be distinguished by the lower growth, the sharper ribs, the shorter less curved (always?) spines, by the lower central spine ~~(not the upper)~~ being the longest & broadest, by the smaller fruit and seed.

It is quite remarkable that we have 3 Echinocacti in Californ which resemble one another so much – the growth and the arrangement of their spines ~~and we nevertheless~~ while – otherwise, the flower and fruit at least one of them differs so materially ~~much~~ from the ~~others~~.

Le Contei

Echinocactus ~~Bigelovii~~ E. sp. see pg 121 note E. Le Contei.

ingens, ~~[illegible]~~ ovatus s. ~~cylindraceo~~ obovato elevatus ~~multicostatus~~; costis 20-30 compressis, subobtusis, crenato interruptis, & areolis elongato–~~ovatis~~ oblongis, approximatis; aculeis ~~4~~ centralibus; ~~4 inferioribus~~ ~~annulatis~~ compressis annulatis, carinatis 3 superioribus sursum, inferiore subinde subhamato & deorsum curvatis ~~s. acutis~~ ~~[illegible]~~; aculeis ~~radialibus~~ robustioribus ~~3-4 infra 3-5 super aculeis centralibus~~ ~~6~~6-10, angulatis subannulatis ~~[illegible]~~ plus minus curvatis; aculeis extimis lateralibus summisque 10-16 tenuibus, (flexuosis), setiformibus ~~floribus sulphureis~~; ~~bacca sicca globosa, squamis 30-40 semiformibus tecta~~ ~~floris~~ floribus e plexerrimis subcentralibus. ovario (30-(40) 50 squamis) semiformibus tecto sepalis tubi [oblongis 25-30, petalis 25-30



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August 1855

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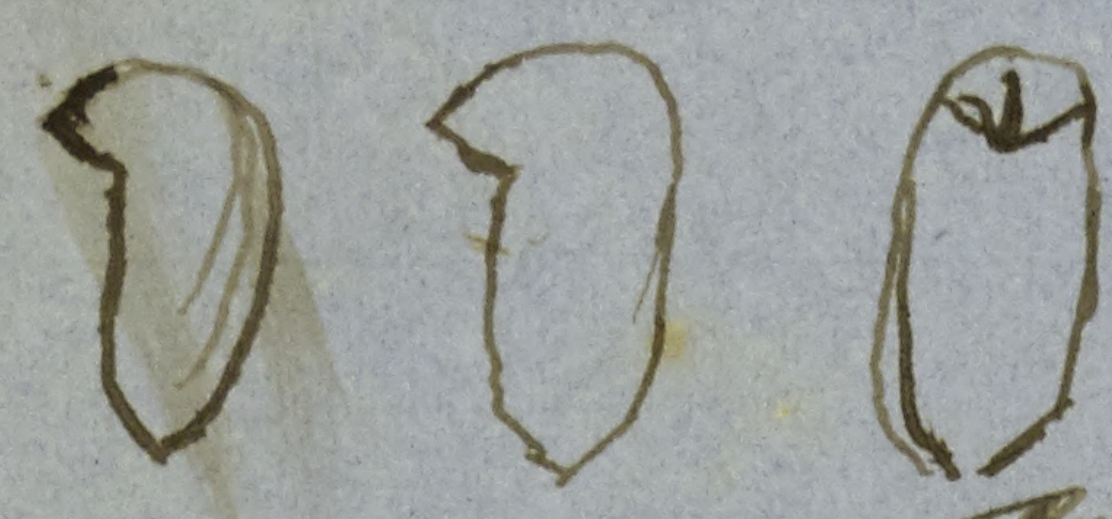

E. Le Contei

F sepalis tubi inferioribus 20-30 ovato lanceolatis acutis ciliatis; superioribus 10-20 margine petaloideis obtusiusculis cuspidatis, petalis 20-30 linearibus spathulatis, obtusis, (sulphureis) in disco fimbriatis ~~obtusis~~ mucronatis basi; tubi interne nuda stylo ~~ad medium~~ stamina superante, ad medium in fasciculum stigmatum linearium sub 14 fisso

sulphureis; F stylo ~~ad medium~~ in stigmata ~~sub 14 div~~ linearia subacuta sub 14 diviso; ~~bacca~~ globosa, sicca, floris rudimentis coronata, squamis 20-50 stipata; seminibus oblique obovatis compressis ~~minutissime~~ scrobiculatis, fuscis;

This fine species was first noticed ~~by Dr Le Conte in 1851 on the lower~~ Gila; he took it for E. Wislizeni to which indeed it bears a great resemblance in habit as well as in botanical characters; But the seed, which I ~~obtained~~ received from him at once satisfied me that I had a distinct species before me. ~~but~~ Failing to ~~obtain~~ ~~the~~ other parts of the plant I only provisionally noted the differences of the seed and gave the plant the name of the discoverer. Subsequently (1853) Dr Bigelow met with this fine species (abundantly from ~~Cactus~~ Pass at the headwaters of Bill Williams Fork) down this stream to the Colorado and west of it till E. polycephalus ~~Engelmanni~~ took its place.+ — It grows on rocky or and often in crevices of perpendicular rocks to the height of 3 ~~4 to~~ sometimes ~~8~~ feet, by 1-2 feet diameter. The 20 to 30 ribs are somewhat interrupted by an transverse incision between the Areolae. ~~Areolae~~ in specimens before me 8 l. long by 4 l. wide and only ½ inch distant from one another x (in some specimens of E. Wislizeni I observe the same closeness, while in others, especially young and vigorous

fl. Aug & Sept (Schott)

MISSOURI BOTANICAL GARDEN
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+ Mr A Schott collected it on the lower Gila and in Sonora abundantly in 1855
gravelly plains

Schotts larger specimens in Sonora were often 3 times as high as in Desert, Bigelows were not as slender

but according to Schotts notes often 2 inches distant.